



SAN DIEGO AREA

**REGIONAL
STANDARD
DRAWINGS**

STANDARD DRAWINGS FOR AGENCIES IN THE SAN DIEGO REGION

Recommended by the Regional Standards Committee

**Maintained and Published by the San Diego County Department of Transportation
July 1979**



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AMERICAN PUBLIC WORKS ASSOCIATION
ASSOCIATED GENERAL CONTRACTORS OF AMERICA
BUILDING CONTRACTORS ASSOCIATION
CALIF. COUNCIL OF CIVIL ENGINEERS & LAND SURVEYORS
CARLSBAD, CITY OF
CHULA VISTA, CITY OF
CORONADO, CITY OF
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ENGINEERING & GENERAL CONTRACTORS ASSOCIATION
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HELIX WATER DISTRICT
IMPERIAL BEACH, CITY OF
LA MESA, CITY OF
LEMON GROVE, CITY OF
NATIONAL CITY, CITY OF
OCEANSIDE, CITY OF

PACIFIC TELEPHONE COMPANY
SAN DIEGO, CITY OF
SAN DIEGO, COUNTY OF
SAN DIEGO COUNTY ROCK PRODUCERS ASSOCIATION
SAN DIEGO GAS & ELECTRIC COMPANY
SAN MARCOS, CITY OF
VISTA, CITY OF
VISTA IRRIGATION DISTRICT

Regional Standards Committee

July, 1979

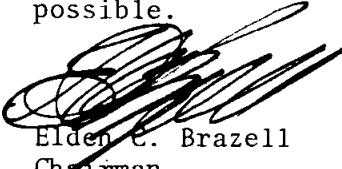
These standard drawings have been adopted by the San Diego Regional Standards Committee for the benefit of all agencies in the San Diego area. The Regional Standards Committee membership is comprised of the County's fourteen cities, the County of San Diego, various representative districts and private industry organizations, the Pacific Telephone Company and the San Diego Gas and Electric Company as named above. The San Diego County Department of Transportation is currently providing coordination and staff support for the Regional Standards Committee.

REVISIONS

The Regional Standards Committee will continuously accept proposed revisions and/or proposed new standard drawings for review. They should be submitted to the Regional Standards staff at the County Department of Transportation. The staff will acknowledge receipt of all proposals in writing. Should the proposed revision be very minor in nature, i.e., a grammatical error, etc., the staff will make the necessary change without taking it to the Regional Standards Committee. Once enough proposals have been submitted to warrant a Regional Standards Committee meeting, the staff will prepare an agenda and schedule a meeting.

At the meeting the Committee will take one of three possible actions: approve the change, reject the change or recommend that a subcommittee further study the change and make recommendations to the Committee. The individual or organization who submitted the change will then be notified in writing of the Committee action. After approval of the proposed change by the Regional Standards Committee the staff will print and distribute the change to the governmental agencies within San Diego County.

It is intended that the standard drawing package will be reprinted and distributed periodically incorporating all the changes approved by the Regional Standards Committee since the last printing. The reprinting will take place when the Regional Standards Committee determines enough revisions have been approved to warrant issuance of an updated drawing package. It is further intended that the Regional Standards be accepted by all Agencies at the earliest date possible.


Elden C. Brazell
Chairman

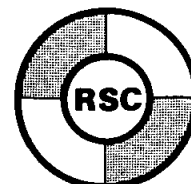


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WATER SYSTEMS

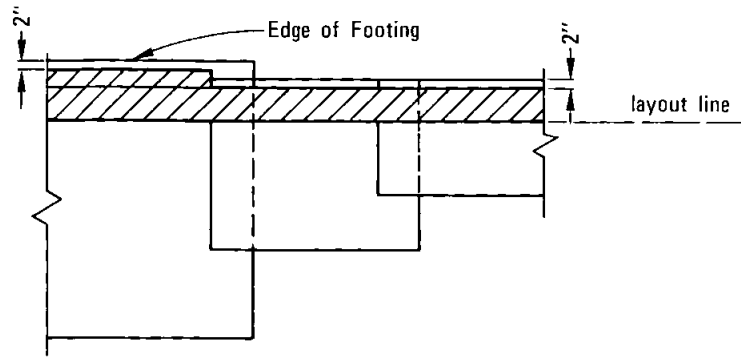
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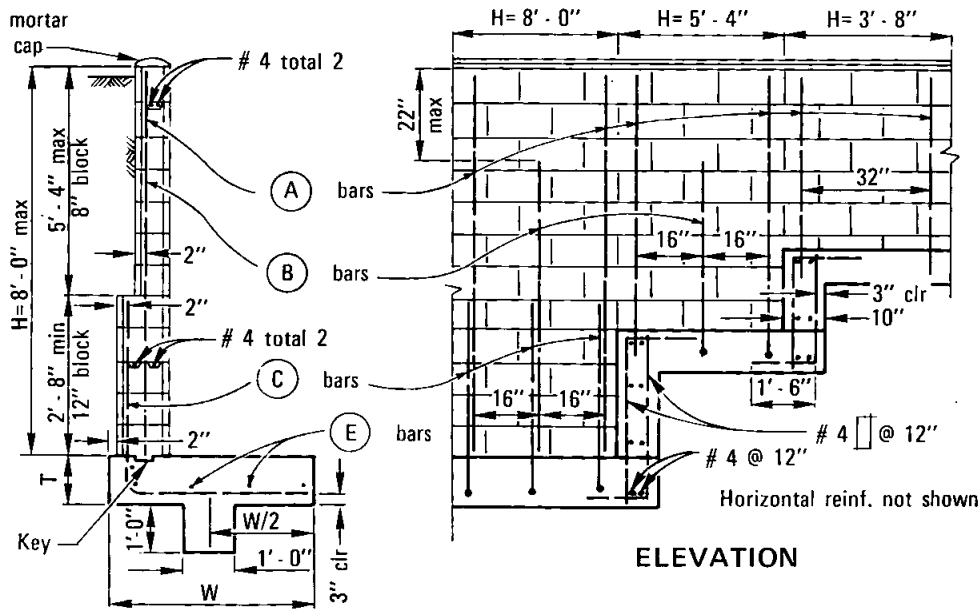
SPECIAL NOTE

Concrete consisting of portland cement, concrete aggregate, sand and water is designated in these Standard Drawings by a symbol consisting of a number, a letter and a number; for example, 564-C-3000. The first number is the weight of cement in pounds per cubic yard, the last number is the compressive strength at twenty-eight days and the letter indicates the grading of the aggregate. This designation is in the STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION, published by the Building News, Incorporated.

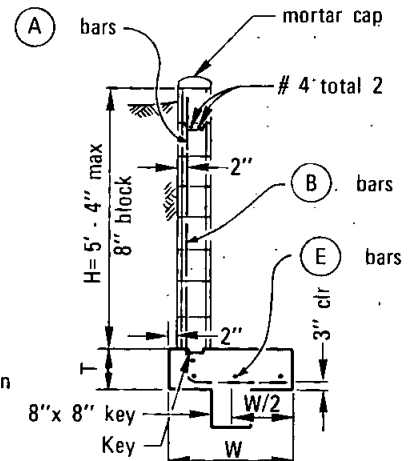
CONCRETE STRUCTURES



PLAN



ELEVATION



TYPICAL SECTION
5' - 4" max

TYPICAL SECTION
over 5' - 4"

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL			
H (max)	3' - 8"	5' - 4"	8' - 0"
T (min)	0' - 8"	0' - 10"	1' - 0"
W (min)	2' - 4"	3' - 6"	5' - 4"
(A) bars	# 4 @ 32"	# 4 @ 32"	# 4 @ 32"
(B) bars	—	# 4 @ 32"	# 4 @ 32"
(C) bars	—	—	# 6 @ 16"
(E) bars	# 4 total 4	# 4 total 5	# 4 total 6
max soil press. (psf)	500	600	800

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

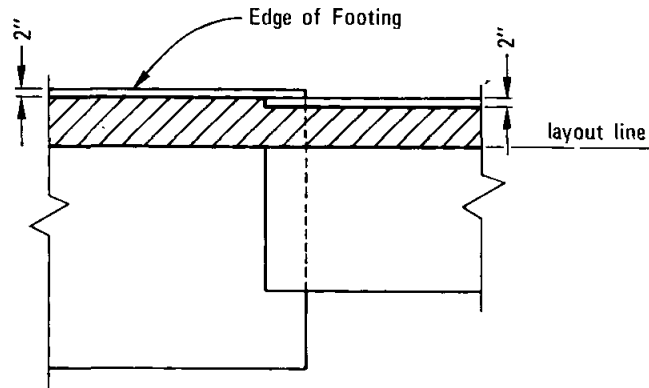
MASONRY RETAINING WALL TYPE 1
(LEVEL BACKFILL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

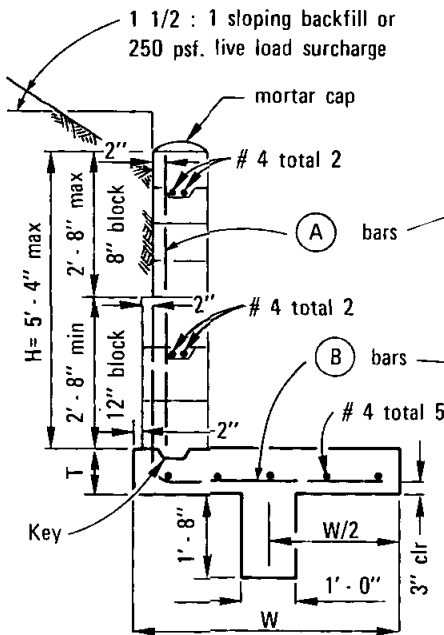
Allan G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

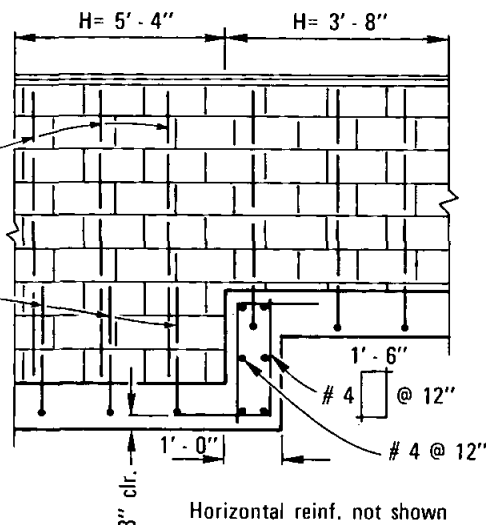
C-1



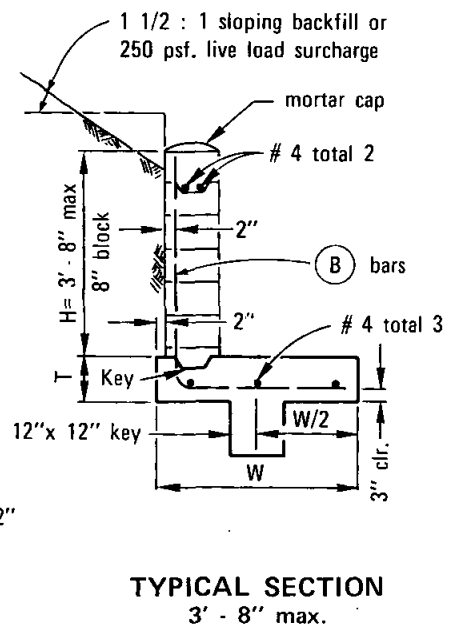
PLAN



TYPICAL SECTION
over 3' - 8"



ELEVATION



TYPICAL SECTION
3' - 8" max.

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL		
H (max)	5' - 4"	3' - 8"
T (min)	0' - 10"	0' - 10"
W (min)	5' - 0"	3' - 9"
(A) bars	# 4 @ 16"	—
(B) bars	# 6 @ 16"	# 4 @ 16"
max. toe press. (psf)	700	550

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-2**

SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 2 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

Revision	By	Approved	Date

PLAN

[illegible]

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all blockcells with grout.

DIMENSIONS AND REINFORCING STEEL			
H (max)	3' - 8"	5' - 4"	8' - 0"
T (min)	0' - 8"	0' - 10"	1' - 0"
W (min)	2' - 4"	3' - 2"	4' - 9"
(A) bars	# 4 @ 32"	# 4 @ 32"	# 4 @ 32"
(B) bars	————	# 4 @ 32"	# 4 @ 32"
(C) bars	————	————	# 6 @ 16"
(D) bars	# 4 @ 32"	# 4 @ 16"	# 6 @ 16"
(E) bars	# 4 total 4	# 4 total 5	# 4 total 6
max. soil press. (psf)	1100	1600	2200

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

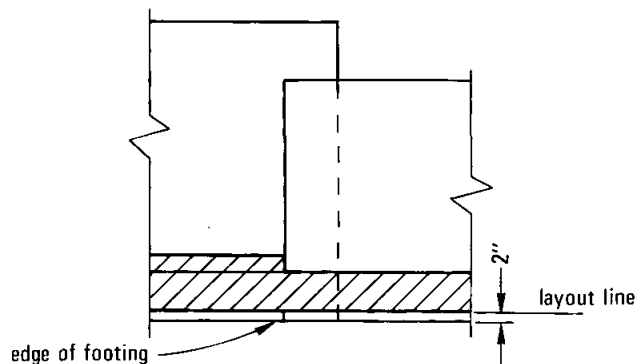
MASONRY RETAINING WALL TYPE 3 (LEVEL BACKFILL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

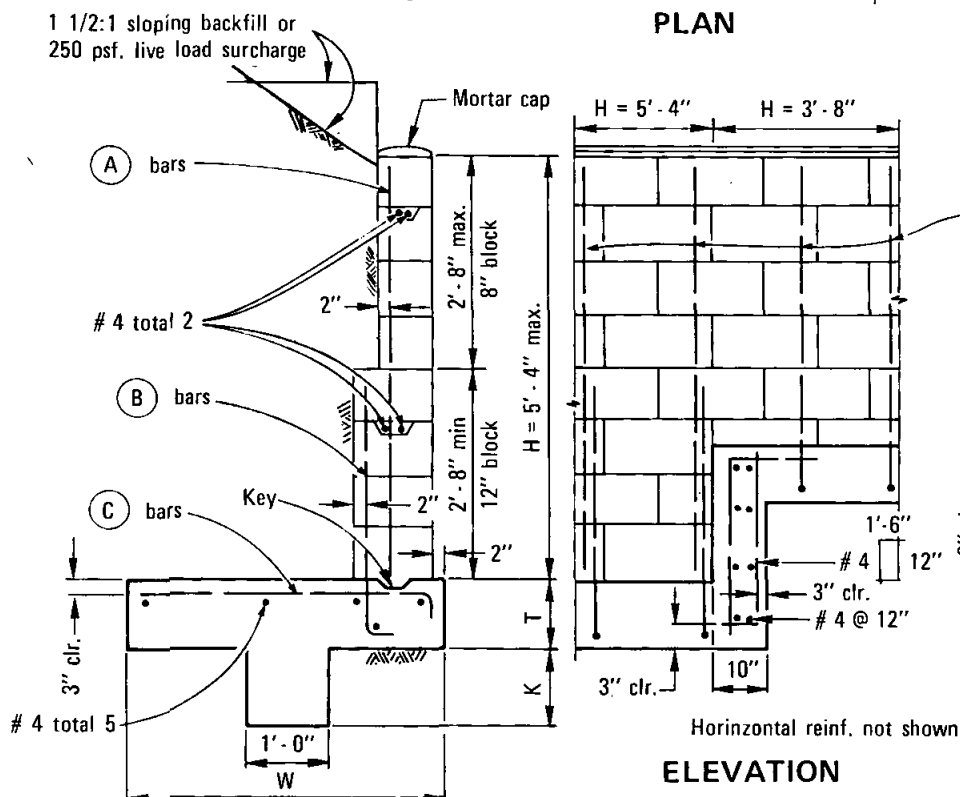
Allan A. Kercheval *Dec. 1975*
Coordinator R.C.E. 19807 Date

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NUMBER

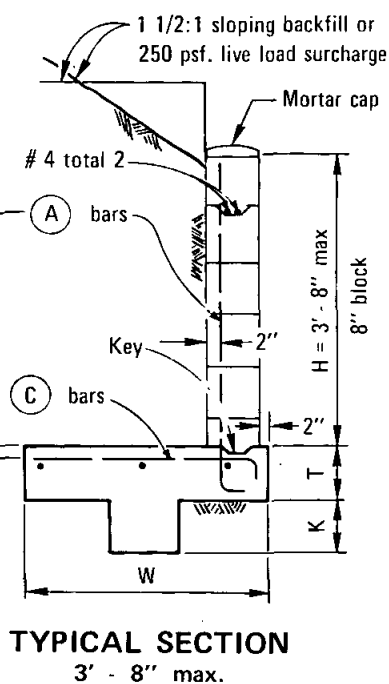
C-3



PLAN



TYPICAL SECTION
over 3' - 8"




TYPICAL SECTION
3' - 8" max.

ELEVATION

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL

H (max)	5' - 4"		3' - 8"	
T (min)	0' - 10"		0' - 8"	
W (min)	4' - 0"		3' - 0"	
(A) bars	# 4 @ 16"		# 4 @ 16"	
(B) bars	# 6 @ 16"			
Surcharge	sloping	live load	sloping	live load
(C) bars	# 6 @ 8"	# 6 @ 16"	# 6 @ 16"	# 6 @ 16"
K (min)	1' - 0"	0' - 8"	1' - 0"	0' - 8"
Toe press.	2700 psf.	1900 psf.	1700 psf	1430 psf

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

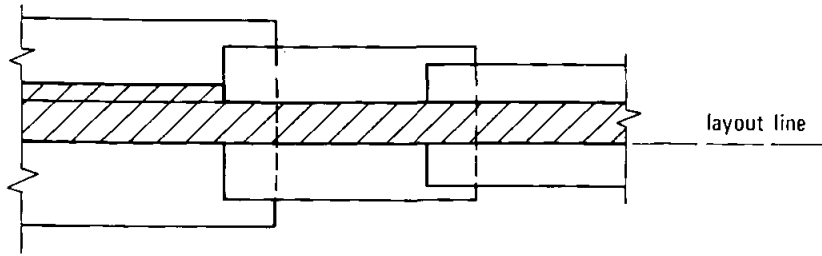
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C-4

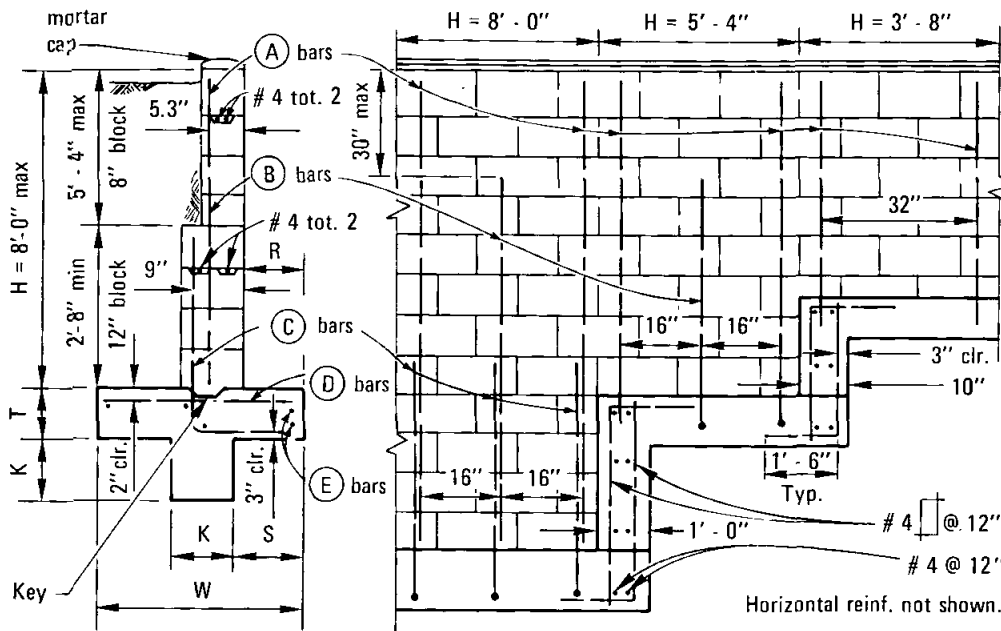
SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 4
(LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

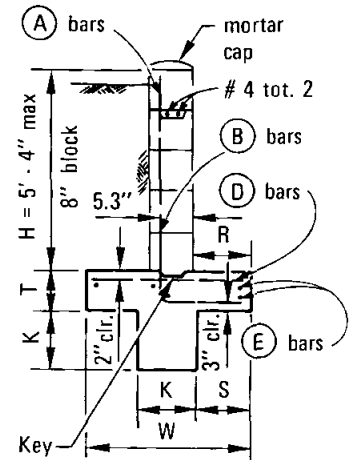
Revision By Approved Date



PLAN



TYPICAL SECTION
over 5' - 4"



TYPICAL SECTION
5' - 4" max

ELEVATION

NOTES

1. See Standard Drawing C-7 and C-8 for additional notes and details
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL

H (max)	3' - 8"	5' - 4"	8' - 0"
T (min)	0' - 8"	0' - 10"	1' - 0"
W (min)	2' - 1"	3' - 1"	4' - 3"
R	0' - 9"	1' - 2"	1' - 5"
S	0' - 8 1/2"	1' - 1/2"	1' - 7 1/2"
K	0' - 8"	0' - 8"	0' - 12"
(A) bars	# 4 @ 32"	# 4 @ 32"	# 4 @ 32"
(B) bars	—	# 4 @ 32"	# 4 @ 32"
(C) bars	—	—	# 7 @ 16"
(D) bars	# 4 @ 32"	# 4 @ 16"	# 4 @ 16"
(E) bars	# 4 total 5	# 4 total 5	# 4 total 6
max soil press. (psf)	774	1030	1660

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

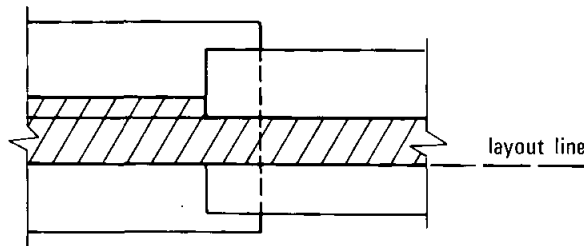
MASONRY RETAINING WALL TYPE 5
(LEVEL BACKFILL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

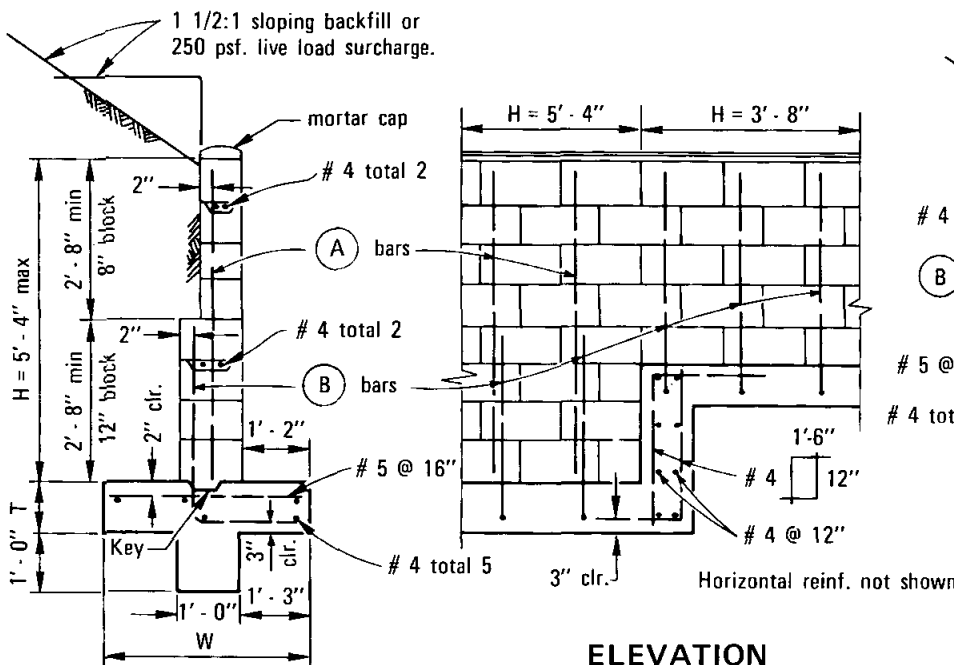
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

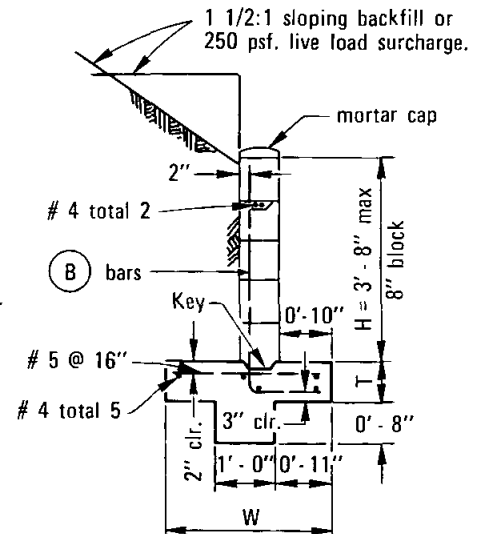
C-5



PLAN



ELEVATION



TYPICAL SECTION
3' - 8" max

TYPICAL SECTION
over 3' - 8"

NOTES

1. See Standard Drawings C-7 and C-8 for additional notes and details.
2. Fill all block cells with grout.

DIMENSIONS AND REINFORCING STEEL		
H (max)	5' - 4"	3' - 8"
T (min)	0' - 10"	0' - 8"
W (min)	3' - 10"	2' - 9"
(A) bars	# 4 @ 16"	—
(B) bars	# 6 @ 16"	# 4 @ 16"
Max. Toe Press. P.S.F.	2000	1400

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-6**

SAN DIEGO REGIONAL STANDARD DRAWING

MASONRY RETAINING WALL TYPE 6 (LIVE LOAD SURCHARGE OR SLOPING BACKFILL)

Revision	By	Approved	Date

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall.

Design H shall not be exceeded.

Footing key is required except as shown otherwise or when found unnecessary by the Engineer.

Special footing design is required where foundation material is incapable of supporting toe pressure listed in table.

DESIGN DATA

Reinforced Concrete:

$F_c = 1200$ psi $F'_c = 3000$ psi

$F_s = 20,000$ psi $n = 10$

Reinforced Masonry:

$F'_m = 600$ psi $F_m = 200$ psi

$F_s = 20,000$ psi $n = 50$

Earth = 120 pcf and equivalent fluid

Pressure = 36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with

Rankine's formula for unlimited sloping

surcharge with $\phi = 33^\circ$ 42'

REINFORCEMENT

Intermediate grade, hard grade, or rail steel deformation shall conform to ASTM A615 A616, A617.

Bars shall lap 40 diameters, where spliced, unless otherwise shown on the plans.

Bends shall conform to the Manual of Standard practice, A.C.I.

Backing for hooks is four diameters.

All bar embedments are clear distances to outside of bar.

Spacing for parallel bars is center to center of bars.

CONCRETE

All concrete shall be 564 - C - 3000.

MASONRY

All reinforced masonry retaining walls shall be constructed of regular or light weight standard grade "A" units conforming to ASTM designation C-90 and manufactured in accordance with requirements of the Concrete Masonry Association Specifications. All masonry shall conform to the regulations of the Uniform Building Code.

MASONRY MORTAR

The mortar shall consist of one (1) part portland cement to three and one-half (3 1/2) parts graded mortar sand. Mortar shall be tempered with lime putty in an amount not exceeding one-quarter to one-half of the volume of the cement.

Mortar in horizontal joints shall fully cover all face shell and web members. Vertical joints shall be buttered to a depth greater than the thickness of the face shells of the block. Furrowing of mortar will not be permitted.

GROUT

The grout shall consist of one (1) part portland cement to three (3) parts clean sand for voids less than four inches. If desired, grout to be used in voids of 4" or greater dimensions, may be mixed of one (1) part portland cement to two (2) parts clean sand to two (2) parts pea gravel. Pea gravel shall be graded such that 100% passes 3/8" sieve and not more than 5% passes the No. 8 sieve. All cells shall be poured solid with grout.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

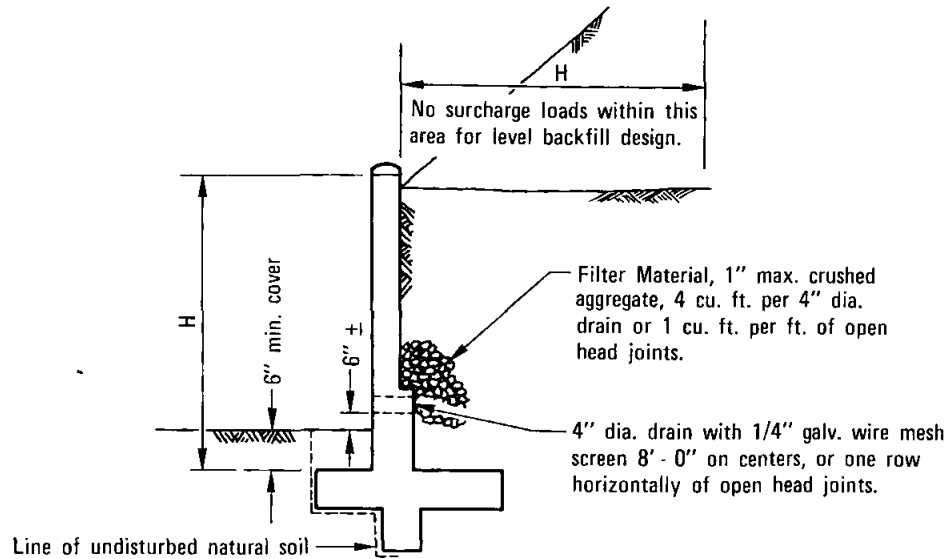
Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90%.

No backfill material shall be deposited against masonry retaining walls until the grout has developed a strength of 2,000 pounds per square inch in compression as determined by test 2" cubes, or until the masonry retaining wall has cured for a minimum of 14 days.

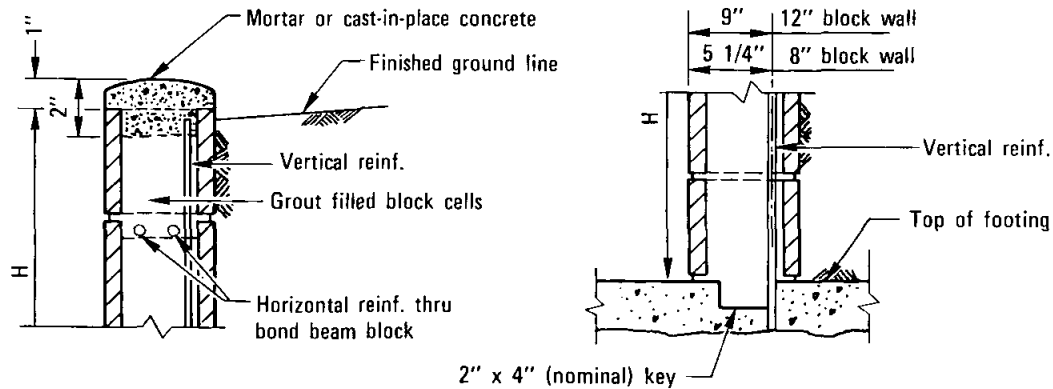
OPTIONAL MORTAR KEY

Embedment of the first course of block in a poured footing may be omitted by providing a mortar key. The key is formed by embedding a flat 2"x 4" flush with the top of the freshly poured footing. Remove the 2"x 4" after the concrete has started to harden.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING GENERAL NOTES FOR MASONRY RETAINING WALLS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Reinf. Note	SC	D.S.	7-79		<i>Allen G. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
					DRAWING NUMBER C-7



TYPICAL SECTION



CAP DETAIL

KEY DETAIL

NOTE

All masonry retaining walls shall be constructed with cap, key and drainage details as shown hereon.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

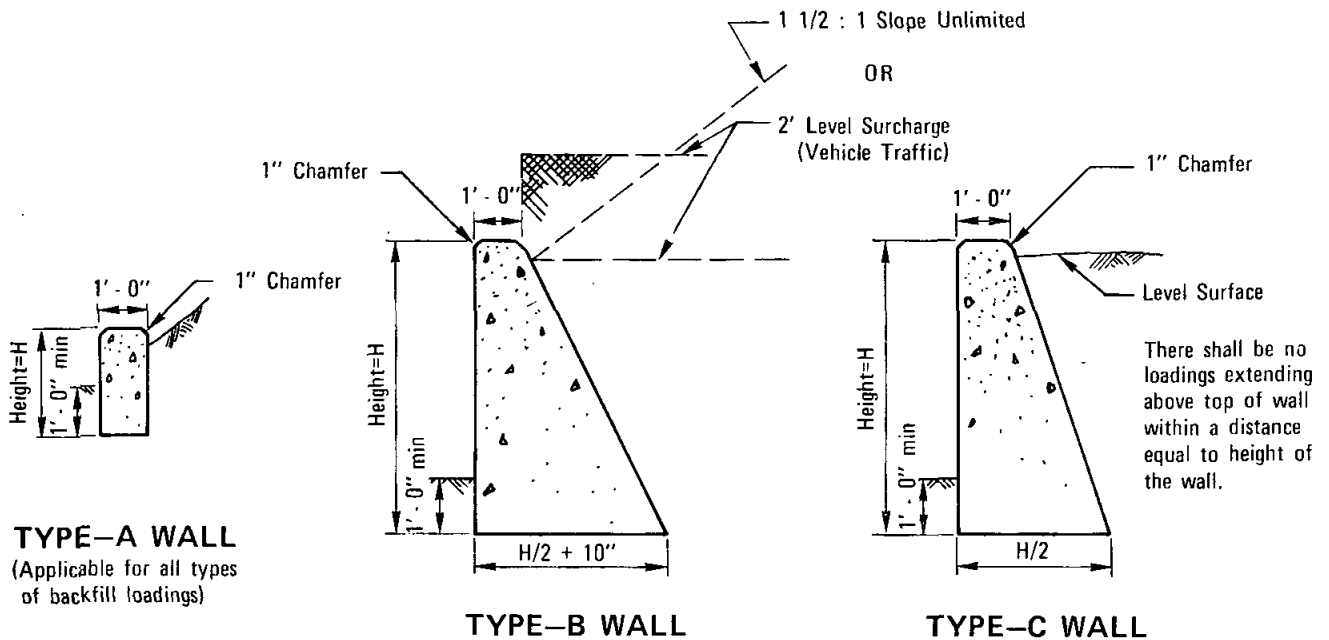
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

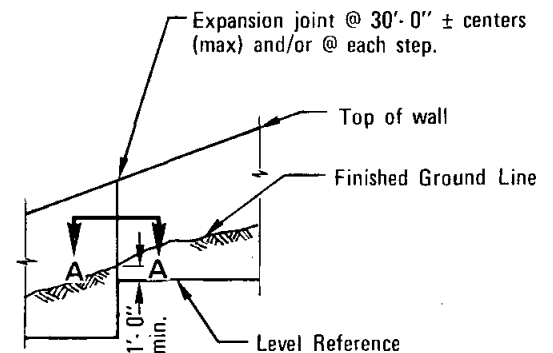
DETAILS FOR MASONRY RETAINING WALL

DRAWING
NUMBER **C-8**

Revision	By	Approved	Date



WALL TYPE	HEIGHT	BASE	CONC CF/FT
A	1' - 6"	1' - 0"	1.50
	2' - 0"	1' - 0"	2.00
B	3' - 0"	2' - 4"	4.99
	4' - 0"	2' - 10"	7.66
	5' - 0"	3' - 4"	10.82
	6' - 0"	3' - 10"	14.49
C	3' - 0"	1' - 6"	3.75
	4' - 0"	2' - 0"	6.00
	5' - 0"	2' - 6"	8.75
	6' - 0"	3' - 0"	12.00



TYPICAL ELEVATION

NOTE

See Standard Drawing C-10 for Section A-A, notes and details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				GRAVITY RETAINING WALLS		<i>Allan A. Kersch</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
				DRAWING NUMBER C-9		

CONCRETE

Concrete shall be 564 - C - 3000.

DESIGN CONDITIONS

Walls are to be used for the loading conditions shown for each type wall.

Design H may be exceeded by six inches before going to next size.

DESIGN DATA

$F_c = 1200 \text{ psi}$ $F'_c = 3000 \text{ psi}$
Earth = 120 pcf and equivalent fluid pressure = 36 psf per foot of height

Walls shown for 1 1/2:1 unlimited sloping surcharge are designed in accordance with Rankine's Formula for unlimited sloping surcharge with $\phi = 33^\circ 42'$.

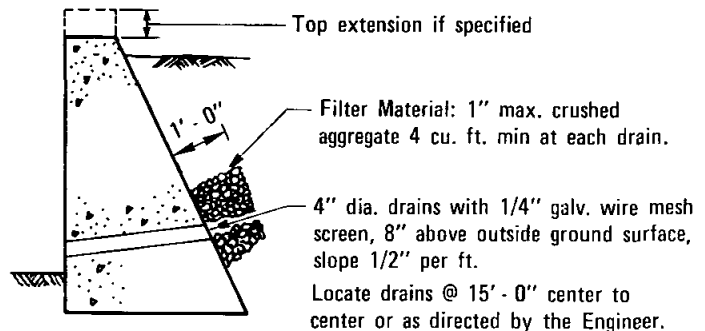
Note: Maximum toe pressure under wall footing = 1 1/2 tons. Special design required where footing material is incapable of supporting this pressure.

EXCAVATION AND BACKFILL

Compaction of backfill material by jetting or ponding with water will not be permitted.

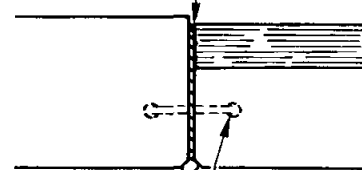
Each layer of backfill shall be moistened as directed by the Engineer and thoroughly tamped, rolled or otherwise compacted until the relative compaction is not less than 90 percent.

No backfill material shall be deposited against concrete retaining walls until the concrete has developed a strength of 2,500 pounds per square inch in compression as determined by test cylinders, or until 28 days after wall has been placed.



TYPICAL DRAINAGE WHEN H IS GREATER THAN 4' - 0"

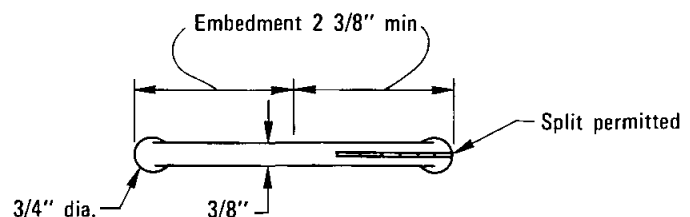
1/2" Expansion joint, fill with premolded expansion joint filler. Locate joints at 30' - 0" \pm centers or as directed by the Engineer.



1/2" chamfer

Water stop, use only when watertight joint is required, see water stop detail.

SECTION A-A



RUBBER WATERSTOP

Use only when watertight joint is required.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

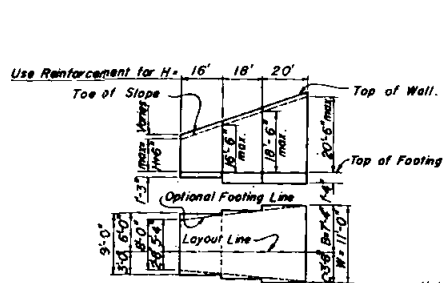
Allan A. Kachand Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **C-10**

SAN DIEGO REGIONAL STANDARD DRAWING

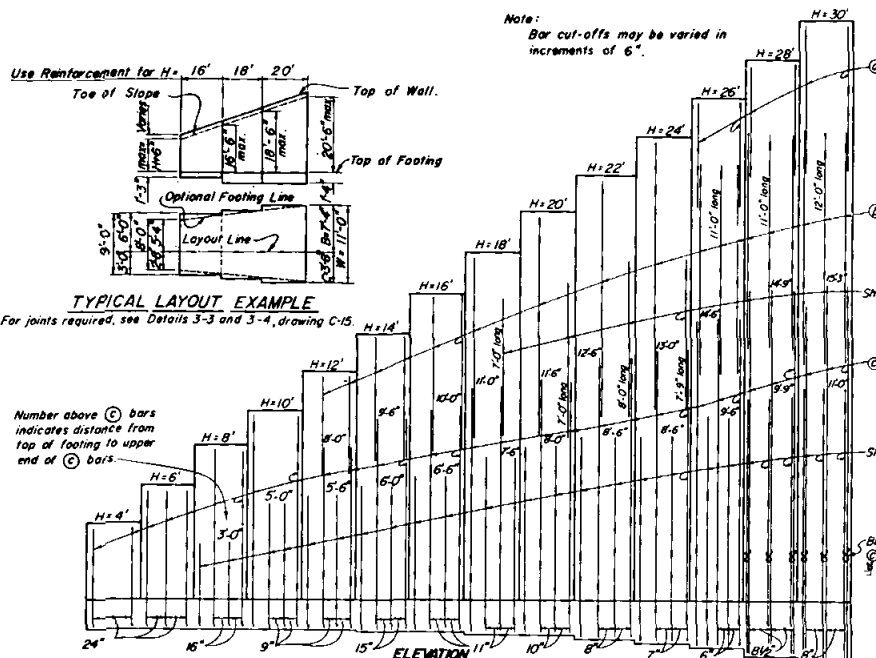
**GENERAL NOTES AND DETAILS
FOR GRAVITY RETAINING WALLS**

Revision	By	Approved	Date

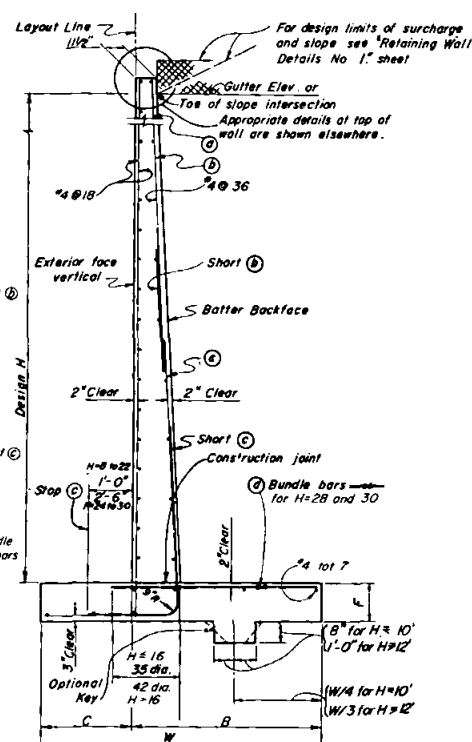


TYPICAL LAYOUT EXAMPLE
For joints required, see Details 3-3 and 3-4, drawing C-15.

Number above (C) bars indicates distance from top of footing to upper end of (C) bars.



Design H	4'	6'	8'	10'	12'	14'	16'	18'	20'	22'	24'	26'	28'	30'
W	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"	8'-2"	9'-0"	10'-0"	11'-0"	12'-0"	13'-3"	14'-3"	15'-3"	16'-9"
C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	2'-8"	3'-0"	3'-4"	3'-8"	4'-0"	4'-5"	4'-9"	5'-1"	5'-5"
B	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"	5'-6"	6'-0"	6'-8"	7'-4"	8'-0"	8'-10"	9'-6"	10'-2"	11'-4"
F Spread Ftg	1'-2"	1'-6"	1'-2"	1'-2"	1'-2"	1'-3"	1'-3"	1'-4"	1'-4"	1'-6"	1'-8"	1'-8"	2'-4"	2'-4"
Batter	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"	12'-12"
(C) bars	#5 @ 24"	#5 @ 24"	#5 @ 15"	#5 @ 9"	#6 @ 9"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"
(B) bars	#5 @ 24"	#5 @ 24"	#5 @ 15"	#5 @ 9"	#6 @ 9"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"
(C) bars	#5 @ 24"	#5 @ 24"	#5 @ 15"	#5 @ 9"	#6 @ 9"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"	#6 @ 12"
Total (C) bars	6-#5	6-#5	6-#5	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7	10-#7
2 Level Surcharge	1.6	1.9	2.2	2.3	2.8	3.3	3.5	4.0	4.3	4.6	4.9	5.3	5.7	6.2
1/2' Limited Slope	1.1	1.5	2.0	2.5	2.7	3.3	3.6	4.2	4.7	5.5	5.9	6.5	7.1	7.5
Spread Footing	17	20	28	37	51	80	105	147	187	246	303	407	449	507
Steel bar ft.	8.9	12.5	16.3	20.2	25.4	30.1	34.6	40.1	45.0	52.1	63.3	77.0	88.1	104.8
Pile ftg	29	32	41	70	84	113	140	172	212	270	322	427	469	528
Steel bar ft.	10.2	12.7	16.7	20.8	25.2	30.1	34.8	40.6	45.7	53.1	64.7	78.6	89.9	107.0

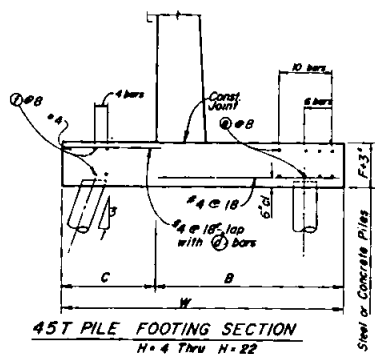


SPREAD FOOTING SECTION

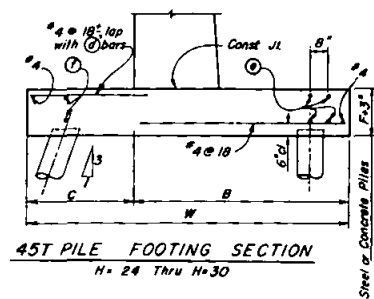
Note:
For details not shown and drainage notes see "Retaining Wall Details No. 1", drawing C-13.
Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation".

Note:
Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown, see Pile Layout on plans.

- For pile footing Design H = 4' use same footing dimensions as Design H = 6'.

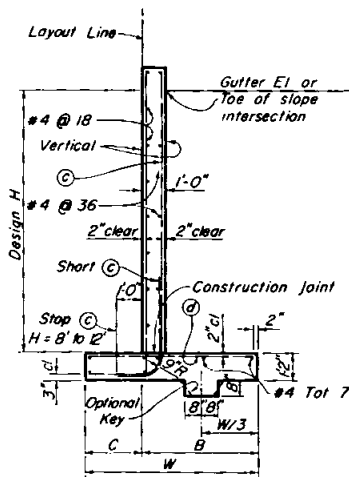


45T PILE FOOTING SECTION
H = 4 Thru H = 22



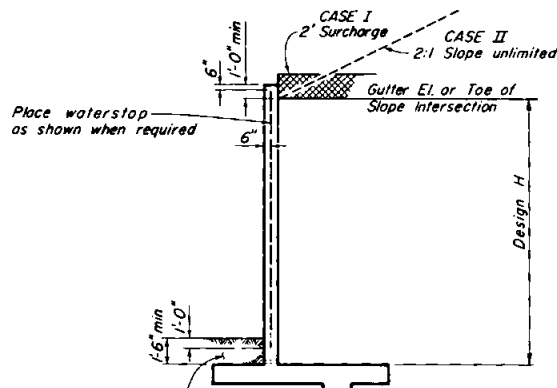
45T PILE FOOTING SECTION
H = 24 Thru H = 30

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING REINFORCED CONCRETE RETAINING WALL TYPE 1	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allen A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
DRAWING NUMBER				C-11	



SPREAD FOOTING SECTION

Place concrete in toe against undisturbed material, except as permitted by the Engineer.



DESIGN

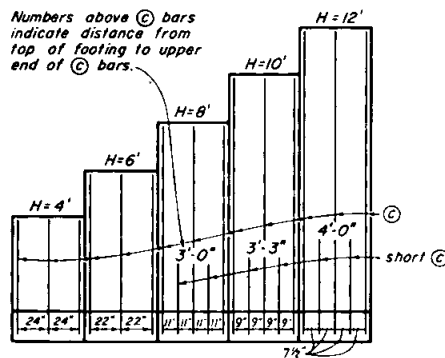
For drainage notes and other details, see "Retaining Wall Details No. 1," drawing C-13.

Note:

Quantities apply to Design H portion and exclude the added portion above "Gutter Elevation."

TABLE OF REINFORCING STEEL DIMENSIONS AND DATA						
Design H	4'	6'	8'	10'	12'	
W	3'-2"	4'-2"	5'-2"	6'-2"	7'-2"	
C	1'-0"	1'-4"	1'-8"	2'-0"	2'-4"	
B	2'-2"	2'-10"	3'-6"	4'-2"	4'-10"	
⊙ bars	#5 @ 24	#5 @ 22	#5 @ 11	#6 @ 9	#7 @ 7 1/2	
Ⓚ bars	#5 @ 24	#5 @ 22	#5 @ 22	#7 @ 18	#8 @ 15	
Total ⊙ bars	6 - #6	6 - #6	6 - #6	10 - #7	10 - #7	
Total Ⓚ bars				4 - #7	4 - #7	
CASE I - Toe Press. psf	1590	1930	2240	2550	2840	
CASE II - Toe Press. psf	1060	1460	1860	2280	2700	
Spread	Steel lbs/ft	15	21	27	46	70
Footing	Conc CF/ft	8.6	11.8	14.9	18.1	21.3
Pile Ftg	Steel lbs/ft	25	32	38	75	101
	Conc CF/ft	9.9	11.9	15.3	18.8	22.2

Numbers above ⊙ bars indicate distance from top of footing to upper end of ⊙ bars.



ELEVATION

Note:

Reinforcement detailed is to be placed in addition to that shown for spread footing. All piles not shown, see Pile Layout on plans.

⊙ For pile footing Design H = 4' use same footing dimensions as Design H = 6'

NOTES

Design Conditions

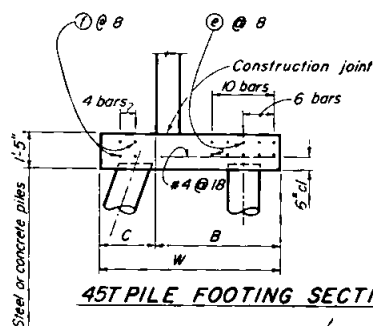
Design H may be exceeded by 6" before going to the next size. Footing key is required except when found unnecessary by the Engineer. Special footing design is required where foundation material is incapable of supporting toe pressure loads listed in table.

Design Data

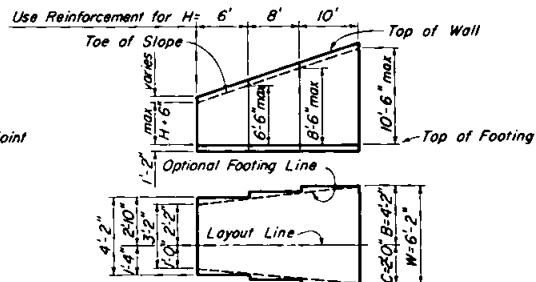
$f_c = 1300$ psi $f'_c = 3250$ psi $f_s = 24,000$ psi
 $n = 10$ earth = 120 pcf

Case I Equivalent fluid pressure = 36 psf max for determination of toe pressure, 27 psf min for determination of heel pressure.

Case II - Earth pressure determined from Rankine's formula with $\phi = 33^\circ - 42^\circ$.



45° PILE FOOTING SECTION



Note:
Bar cut-offs may be varied in increments of 6".

TYPICAL LAYOUT EXAMPLE

For joints required, see Details 3-3 and 3-4, drawing C-15

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

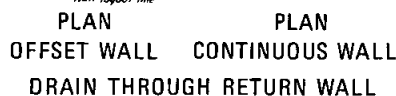
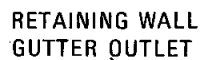
DRAWING
NUMBER

C-12

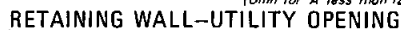
SAN DIEGO REGIONAL STANDARD DRAWING

**REINFORCED CONCRETE RETAINING WALL
TYPE 1A**

Revision	By	Approved	Date



Sizes to fit Standard Hubs



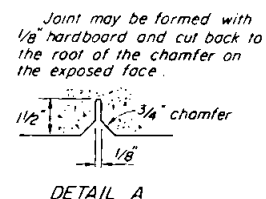
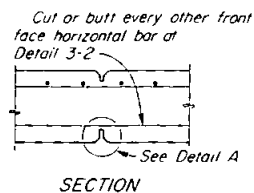
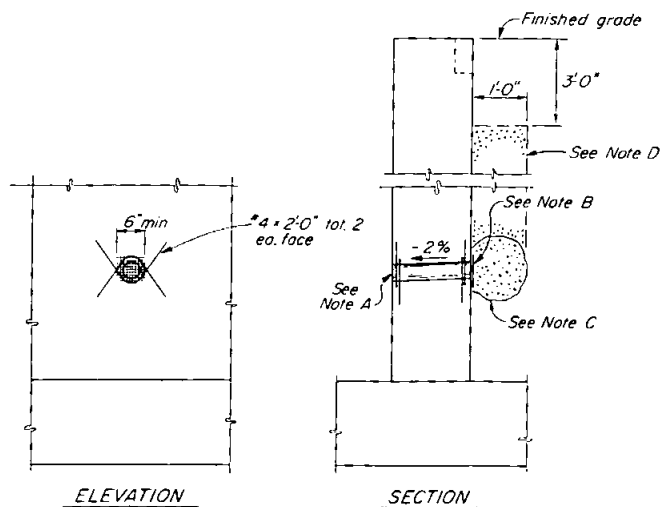
RETAINING WALL-UTILITY OPENING
To be used in conjunction with the "Retaining Wall Type 1" sheet.
Max. size of Opening (A)=48"

C-14

SAN DIEGO REGIONAL STANDARD DRAWING

RETAINING WALL DETAILS NO. 2

Revision	By	Approved	Date



WEAKENED PLANES

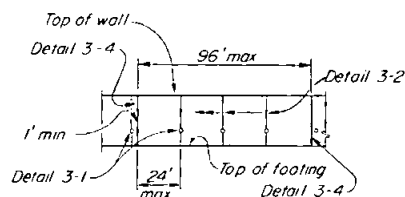
DETAIL 3-2

WEEP HOLE AND PERVIOUS BACKFILL

DETAIL 3-1

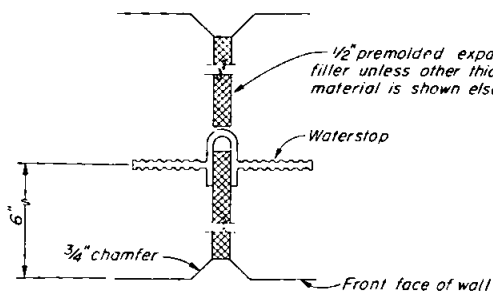
Notes :

- 4" x 4" drains @ 25' max. center to center (9' c.c. for Type 3 and 9'-3" c.c. for Type 4 Retaining Walls). For walls adjacent to sidewalks or curbs, provide 4" cast iron or asbestos cement pipe under the sidewalk to discharge thru curb face. Exposed wall drains shall be located 3" ± above finished grade.
- 6" square aluminum or galvanized steel wire 4 mesh hardware cloth. (Min wire diameter 0.03") Anchor firmly to backface.
- One cubic foot pervious backfill material in a burlap sack, securely tied.
- Pervious backfill material continuous behind retaining wall.



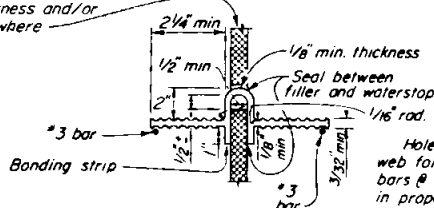
WALL EXPANSION JOINTS AND WEAKENED PLANES

DETAIL 3-3



WALL EXPANSION JOINT

DETAIL 3-4



WATERSTOP

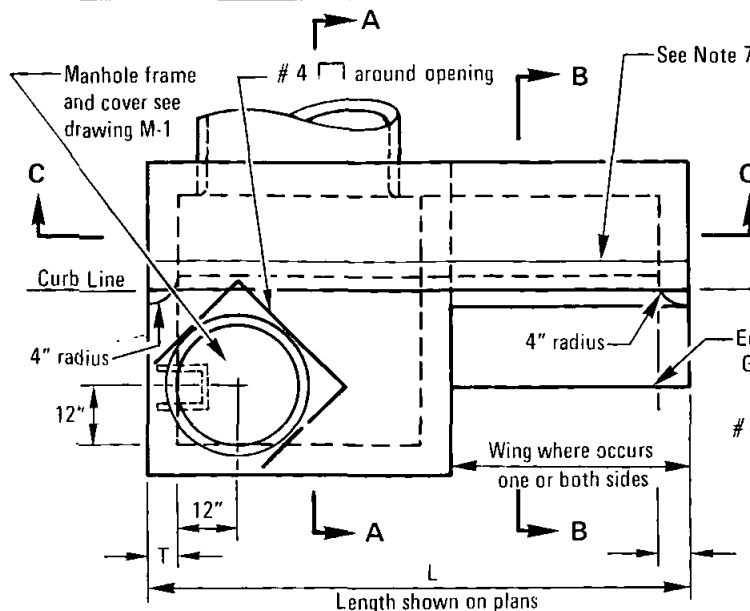
DETAIL 3-6

Waterstop to have 5 or more pairs of raised ribs to provide 0.1 sq. in. min. rib cross-section area on each half of the waterstop. Height of ribs to be 3/32 min.

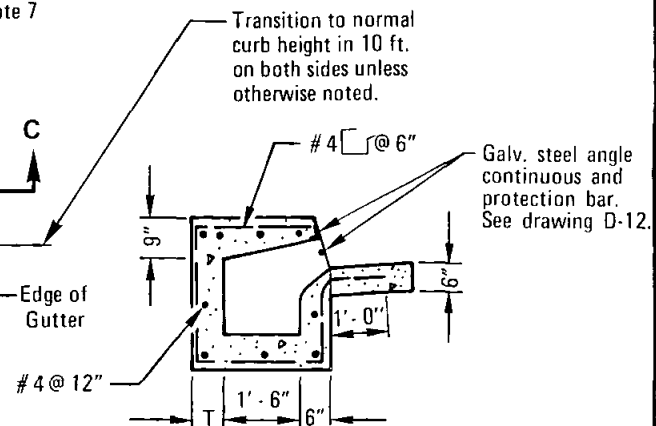
Holes will be permitted in the outer 1/2" of the web for wire, rings, etc. Tie web to #3 reinforcing bars @ 12" max. intervals to support the waterstop in proper position during concrete placement. Alternative detail may be submitted for approval of the Engineer.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						Allen A. Kerschman	Dec. 1975
				RETAINING WALL DETAILS NO. 3		Coordinator R.C.E. 19807	Date
				DRAWING NUMBER		C-15	

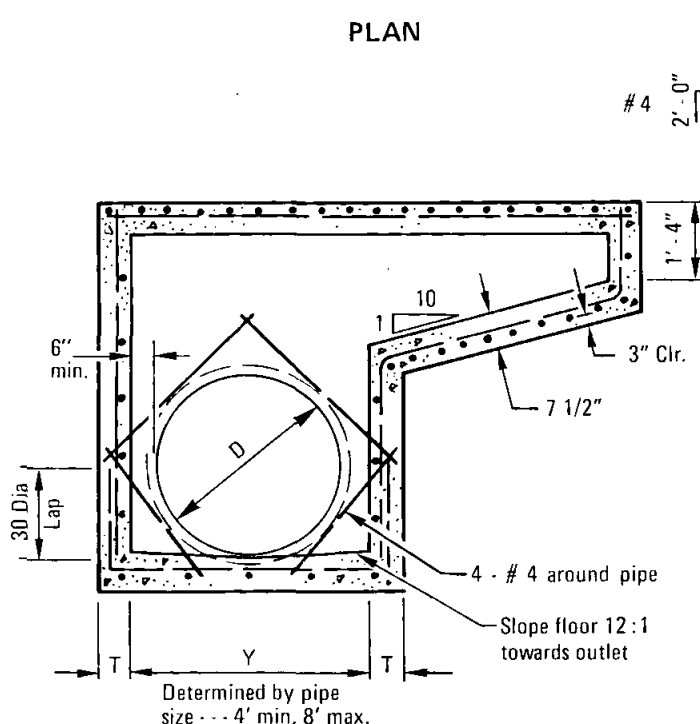
DRAINAGE SYSTEMS



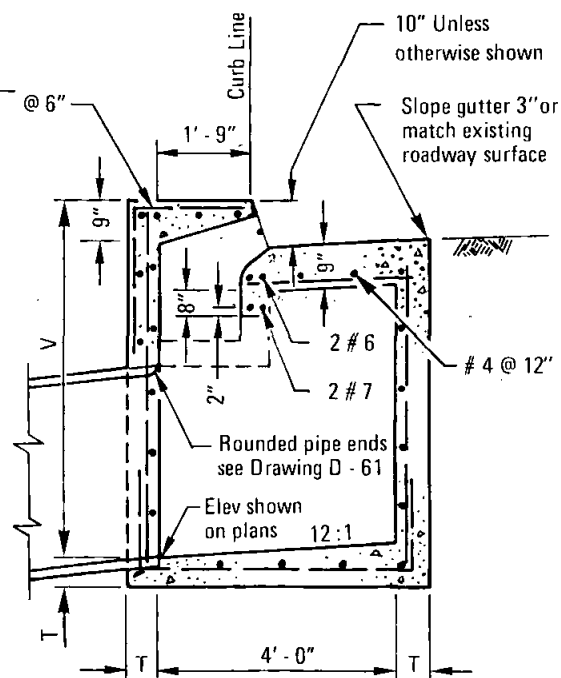
PLAN



SECTION B-B



SECTION C-C



SECTION A-A

NOTES:

1. See Standard Drawings D-11 & D-12 for additional notes and details.
2. Types are designated as follows: (no wing) A, (one wing) A-1, (two wings) A-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS

15' Type A-1 inlet



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

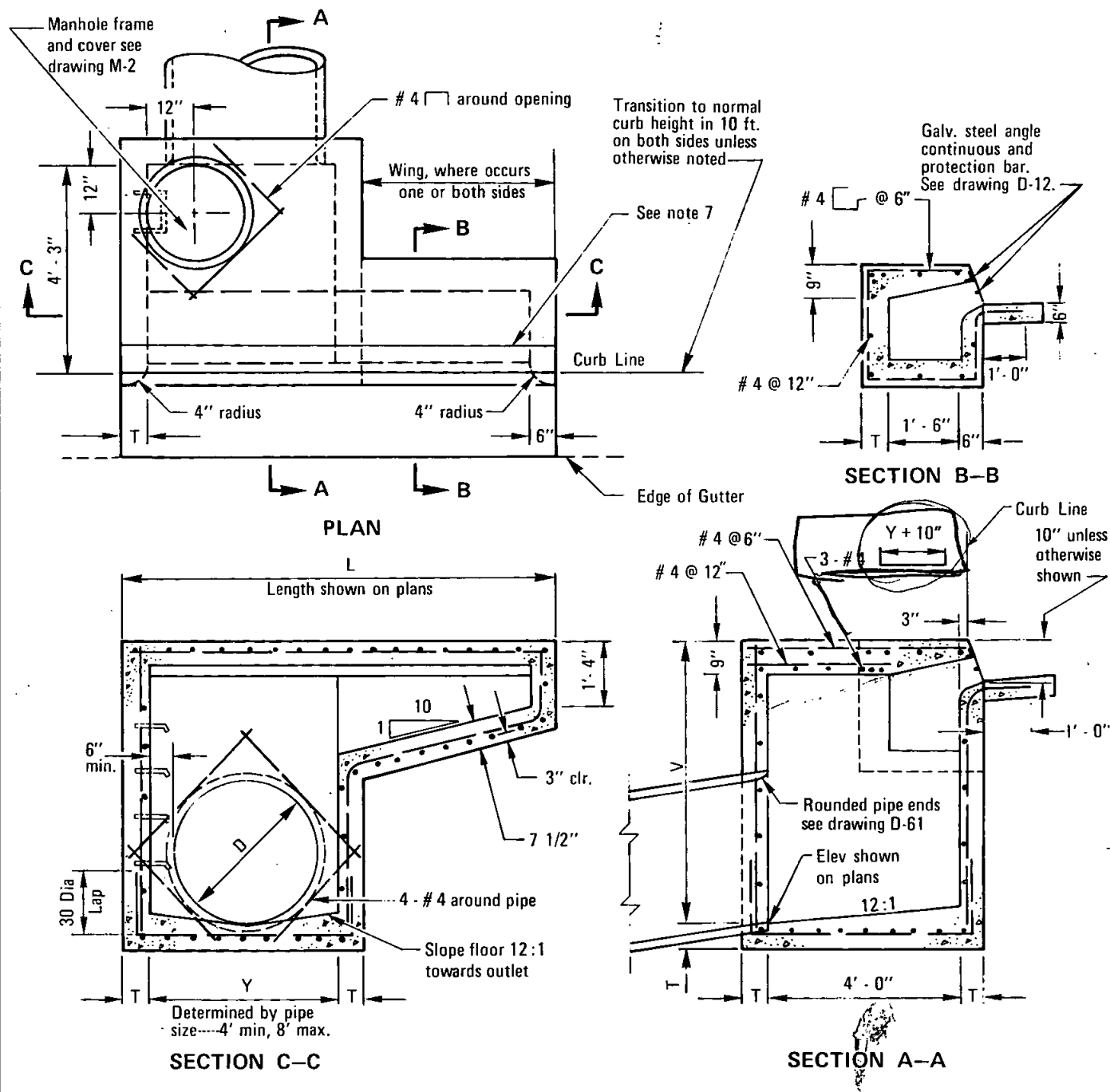
CURB INLET - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Coordinator R.C.E. 19807 Date

DRAWING NUMBER

D-1

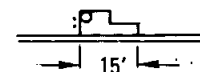


NOTES:

1. See Standard Drawings D-11 & D-12 or additional notes and details.
2. Types are designated as follows: (no wing) B, (one wing) B-1, (two wings) B-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.

LEGEND ON PLANS

15' Type B-1 inlet



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator H.C.E. 19807 Date

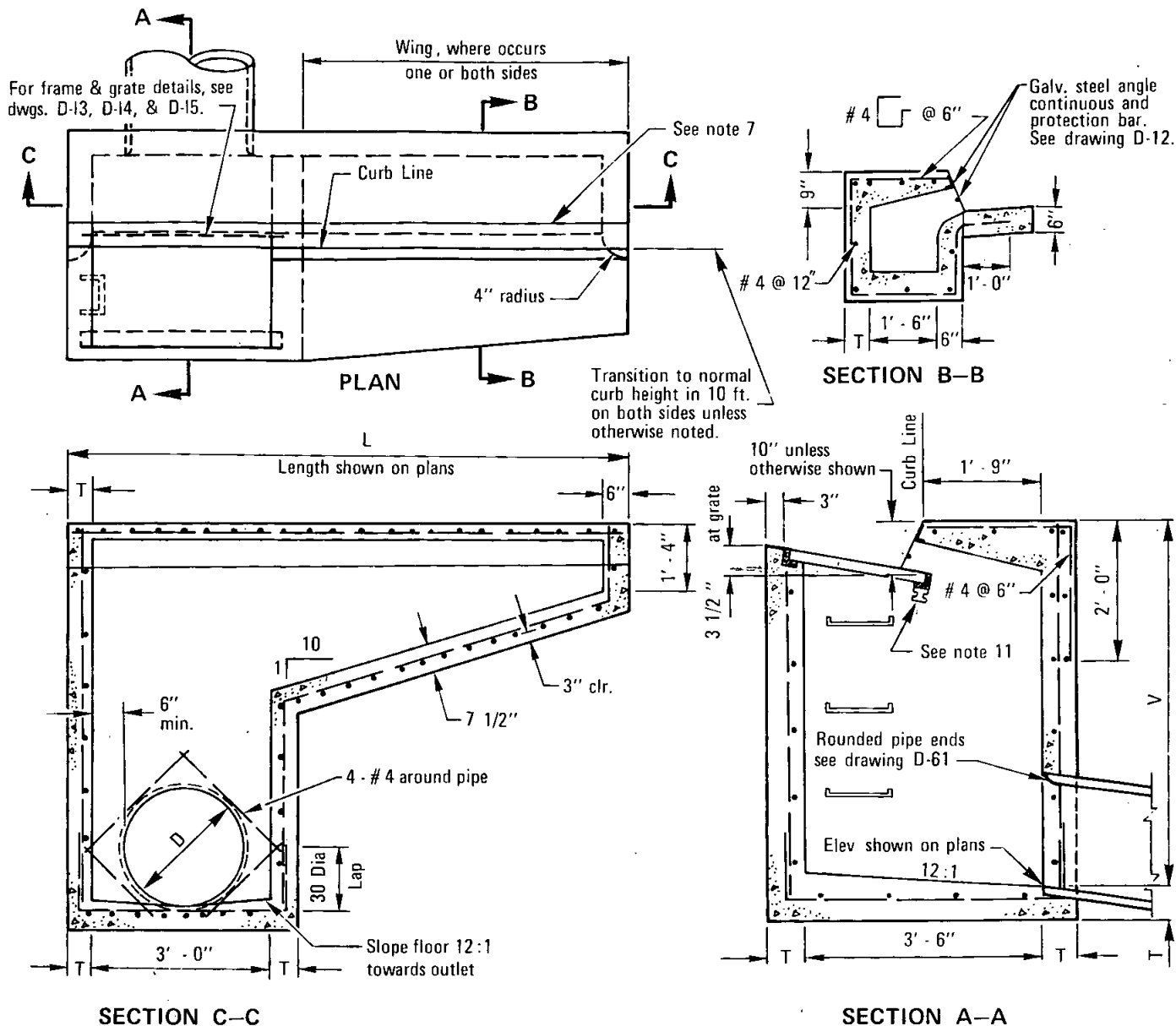
DRAWING
NUMBER

D-2

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE B

Revision	By	Approved	Date
Notes	J.S.	D.S.	7-78

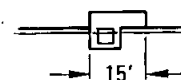


NOTES:

1. See Standard Drawings D-11 through D-15 for additional notes and details.
2. Types are designated as follows: (no wing) C, (one wing) C-1, (two wings) C-2.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. When V exceeds 4 ft. steps shall be installed. See Standard Drawing D-11 for details.
5. Concrete gutter to match adjacent gutters.
6. An expansion joint shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.
9. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
10. Where inlet is to be constructed on grade and Standard Drawing D-20 concrete apron is required, lift down-grade end of grate as shown on D-20.
11. When G-1 & G-2 grates are used place 3"-5.7 lb. steel I-beam, 3.5' long.

LEGEND ON PLANS

15' Type C-1 Inlet



Revision	By	Approved	Date
Notes	EC	D.S.	7.7.79

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE C

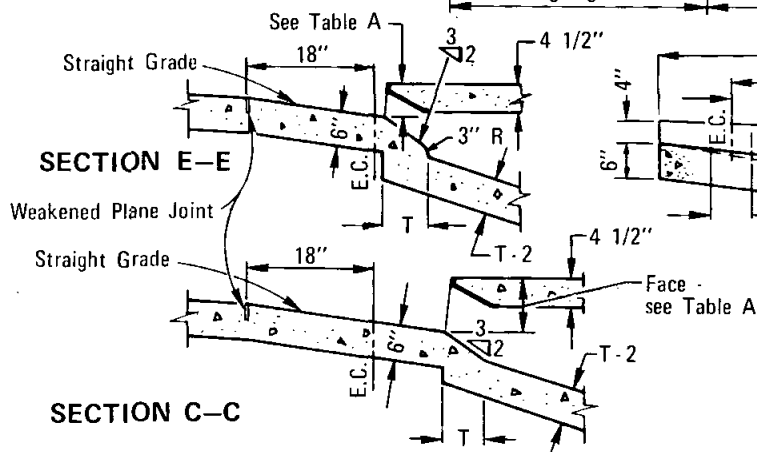
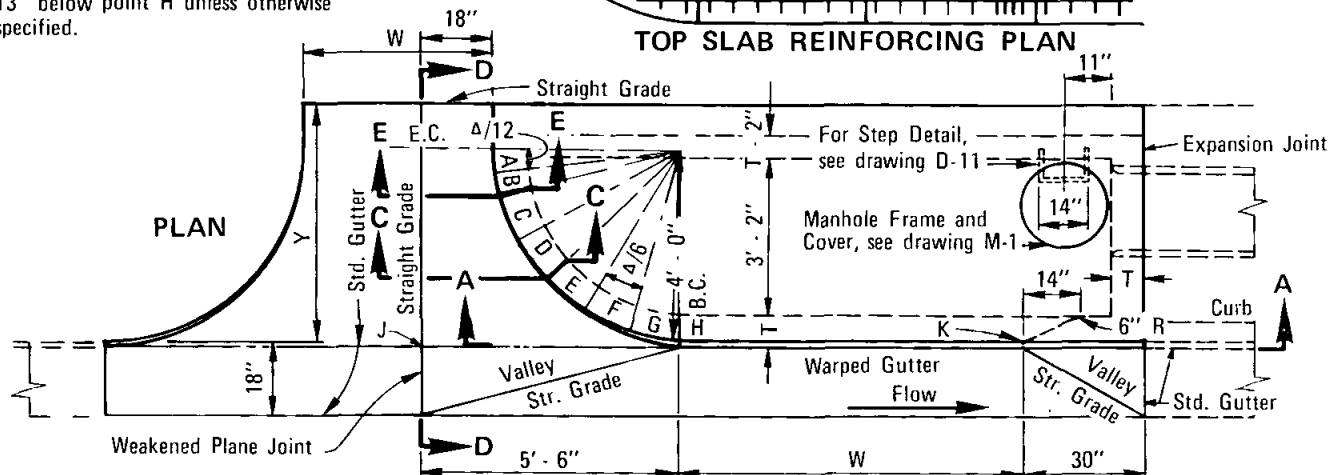
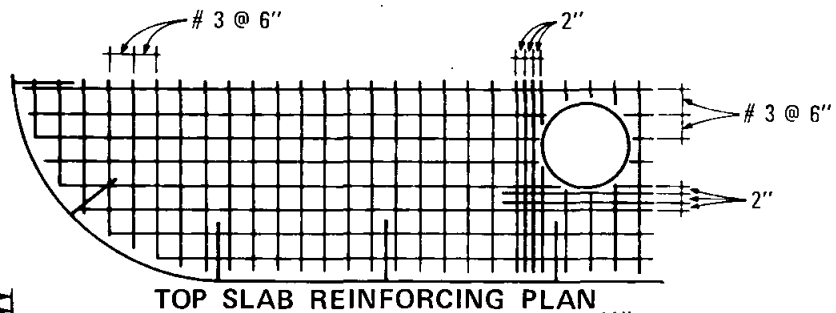
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen A. Kuehnert Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-3**

DIMENSIONS

$T = 8''$ if V is less than $8'$.
 $T = 10''$ if V is $8'$ or more.
 $V = 5'$ unless otherwise specified.
 $V = D + 32''$ minimum.
 $W = 7'$ unless otherwise specified.
 $Y = 5'$ unless otherwise specified.
 Width of driveway, W , shall be $10'$ unless otherwise specified.
 Elevation of point N shall be $13''$ below point H unless otherwise specified.



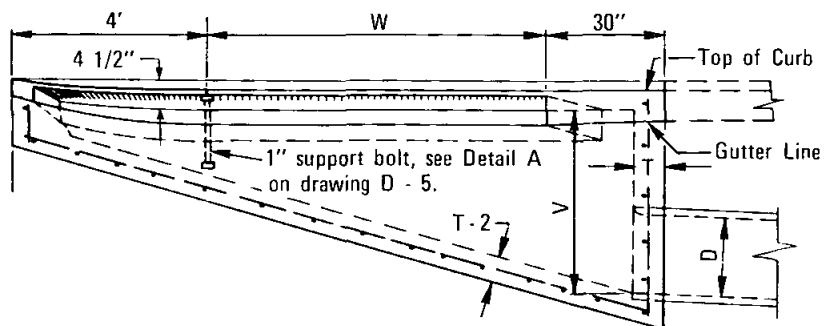
SECTION D-D

PT	A	B	C	D	E	F	G	H	K	M
F.C.	4 1/2"	5 1/4"	6"	7 1/2"	9"	9"	9"	9"	9"	8"

TABLE A

NOTES

1. Steel Plate should be of one continuous piece with curve portion a circular arc. Length = Width + 18" + circular arc.
2. # 4 rebar 30" long, 1' O.C. shall be installed in top of walls for ties to top and gutters.
3. The reinforcing steel in the top slab shall be # 3 bars 6" O.C. unless otherwise specified. Clearance shall be 1 1/2" from the bottom of the slab.
4. Concrete for the inlet top to be placed at the same time as the s/w curb and gutter.
5. Concrete shall be 564 - C - 3000.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".
7. Surface of top slab shall be sidewalk finished to drain toward street at a slope of 1/4" per foot.



SECTION A-A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

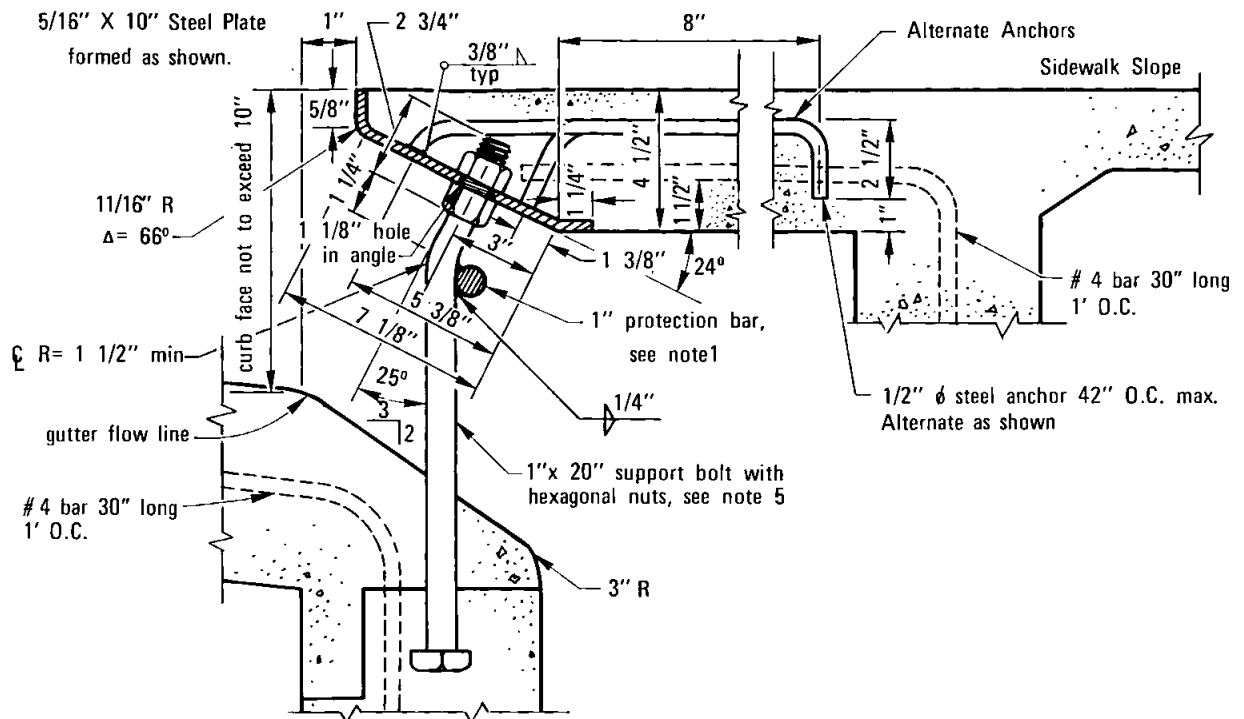
Allan G. Kerschbaum Dec. 1975
 Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET - TYPE D

DRAWING NUMBER **D-4**

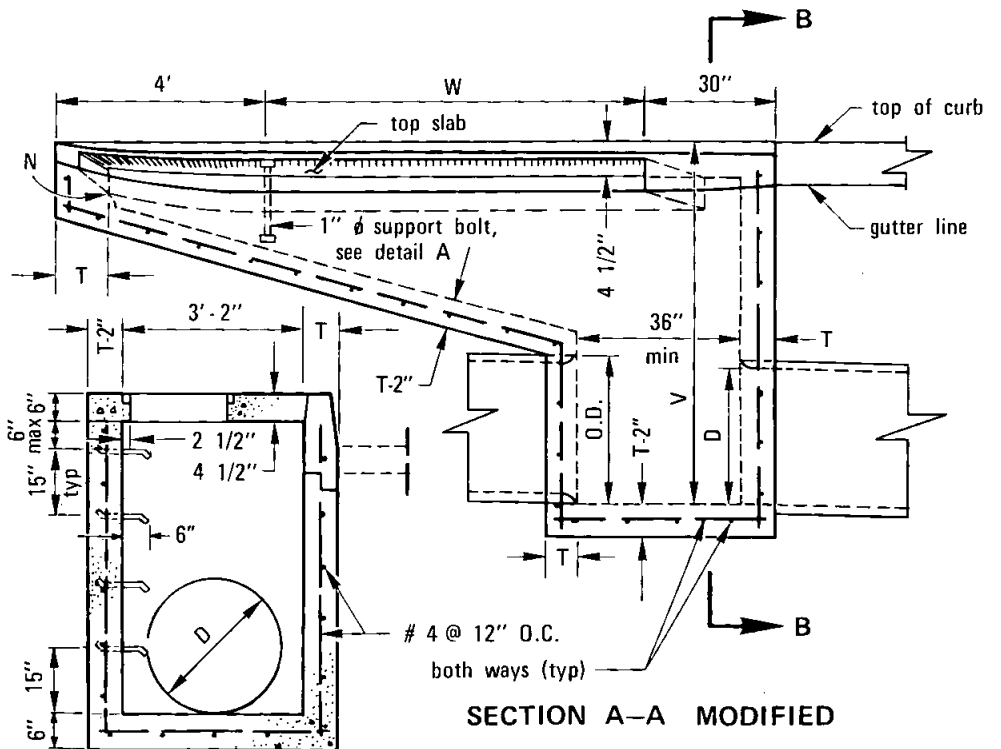
Revision	By	Approved	Date



DETAIL-A

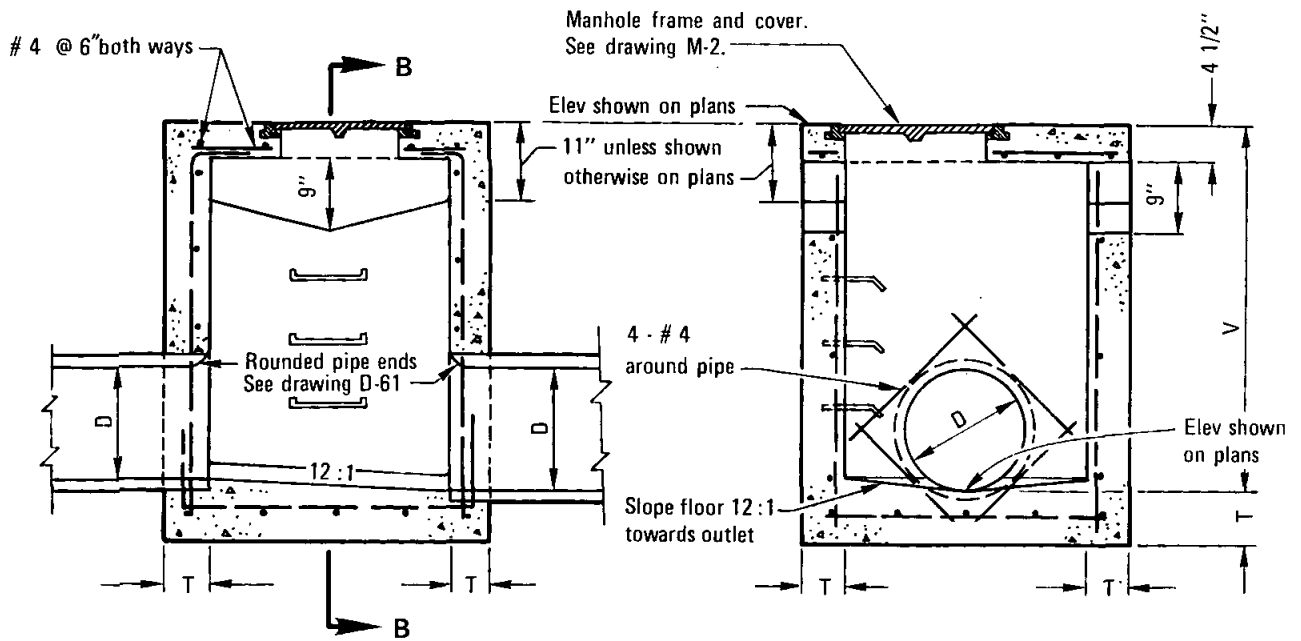
NOTES

1. A plain, round steel protection bar 1" in dia. shall be installed. Bar shall be embedded 5" at each end.
2. Leave 8" hole blocked out in bottom placing of concrete for bolts placed at same time as gutter.
3. All exposed metal parts shall be galvanized.
4. All galvanizing damaged by welding shall receive two coats of aluminum paint.
5. Support bolts shall be spaced at not more than 5' - 0" O.C.
6. Adjusting nuts to be tightened and secured in place when steel plate is in proper position.



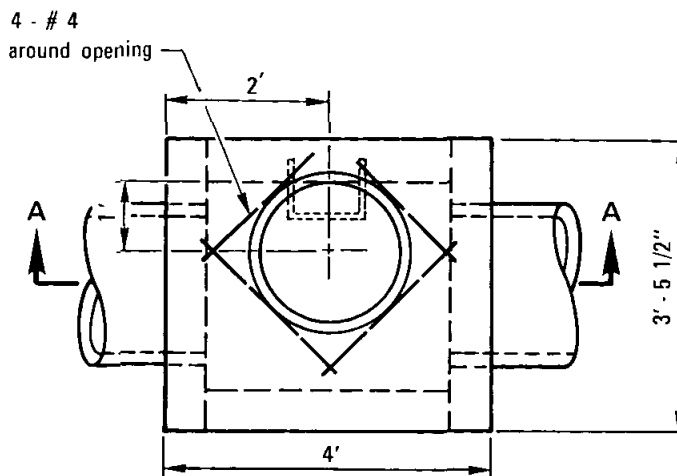
SECTION B-B

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Allan A. Kuehn</i> <i>Dec. 1975</i>	Coordinator R.C.E. 19807 Date
				CURB INLET - TYPE D (DETAILS)		DRAWING NUMBER	
						D-5	



SECTION A-A

SECTION B-B

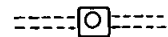


PLAN

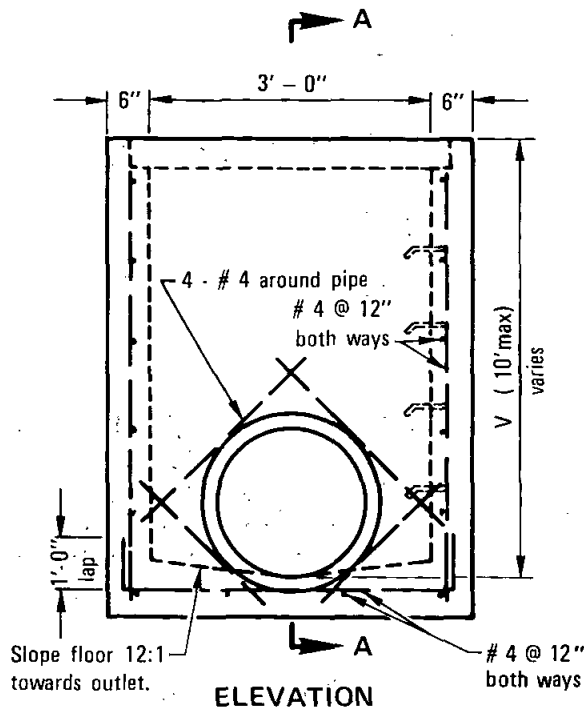
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 4' steps shall be installed. See Standard Drawing D-11 for details.
3. Exposed edges of concrete shall be rounded with a radius of 1/2".
4. Openings on both sides unless otherwise shown on plans.
5. Maintain 1 1/2" clear spacing between reinforcing and surface.

LEGEND ON PLANS

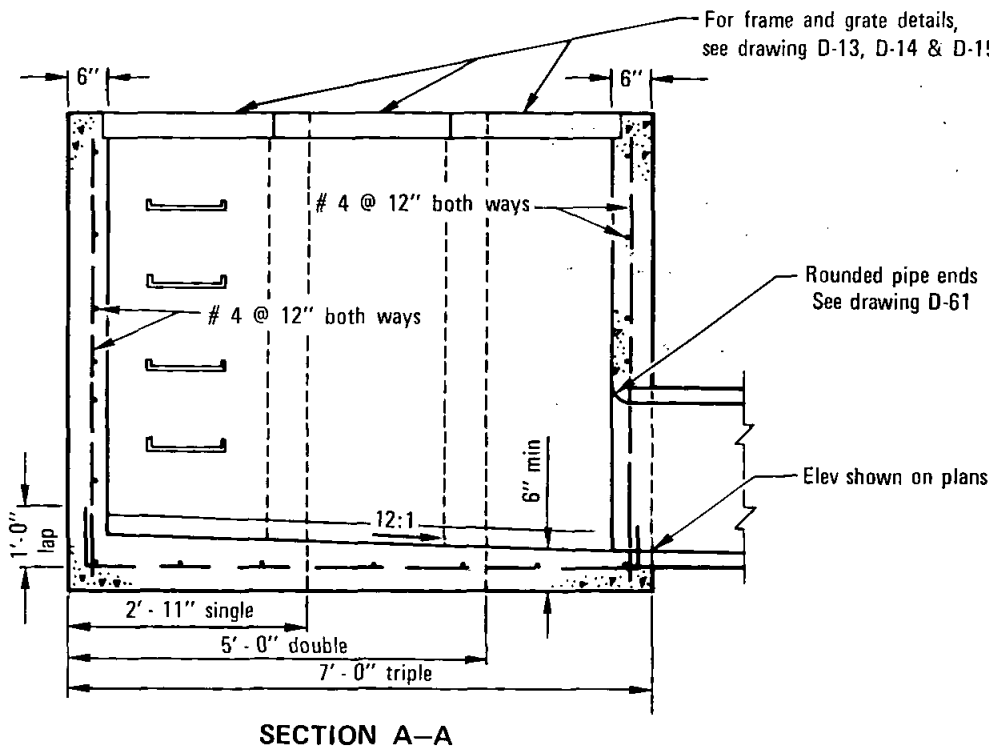


Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				CATCH BASIN - TYPE F		<i>Allen A. Kershner</i> Dec. 1975 Coordinator R.C.E. 19807 Date
						DRAWING NUMBER D-7

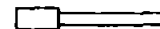


NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When V exceeds 4', steps shall be installed. See Standard Drawing D-11 for details.
3. Maintain 1 1/2" clear spacing between reinforcing and surface.
4. Increase in allowable depth subject to approval by Agency.
5. Section A-A shows 3 sizes and shall not imply that an interior wall is to be built for the structures with double or triple frame and grate.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".
7. Designate types as follows: Single G-1, Double G-2 and Triple G-3.
8. Only end bearing grates shall be used, Types G-3 and G-4. See Standard Drawing D-14 and D-15.



LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

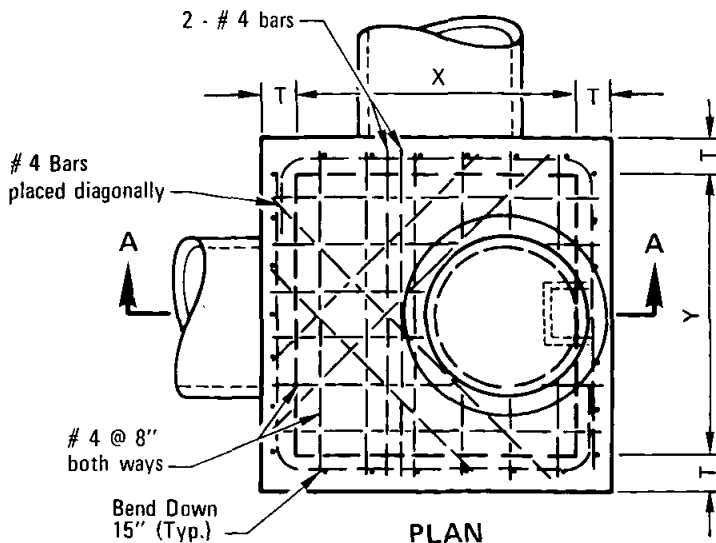
Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-8**

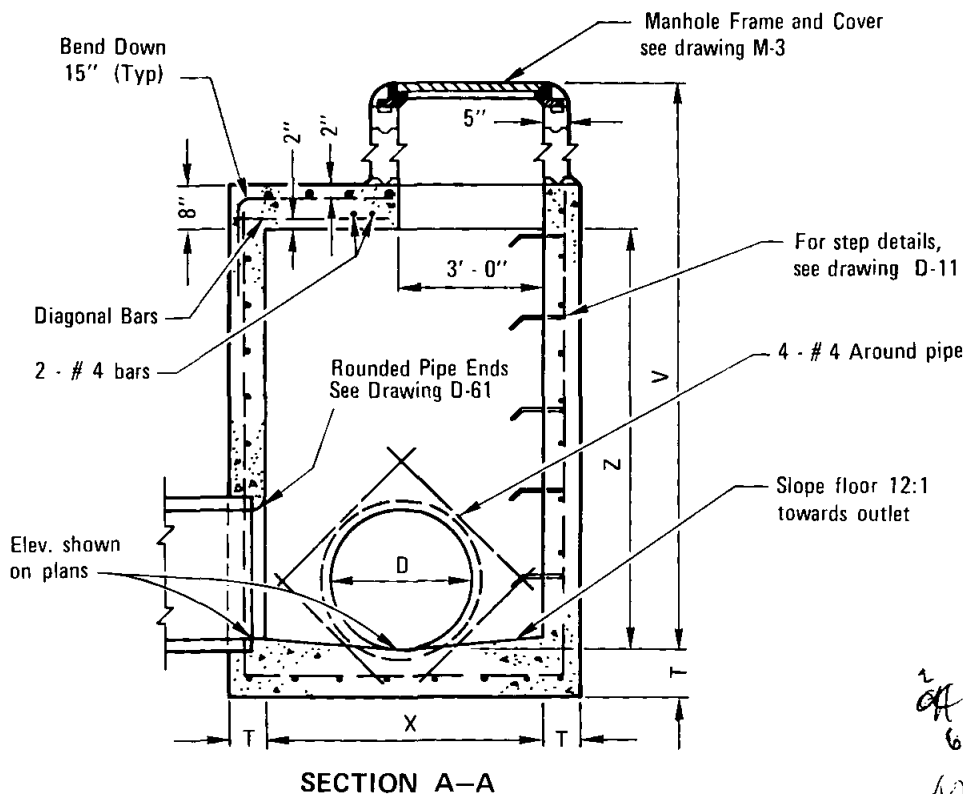
SAN DIEGO REGIONAL STANDARD DRAWING

CATCH BASIN - TYPE G

Revision	By	Approved	Date



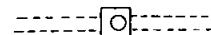
TYPE	PIPE DIA	X	Y	Z
A 4	up to 39"	4'	4'	6'
A 5	42" to 48"	5'	4'	6'
A 6	51" to 60"	6'	4'	6'
A 7	63" to 72"	7'	4'	7'
A 8	75" to 84"	8'	4'	8'



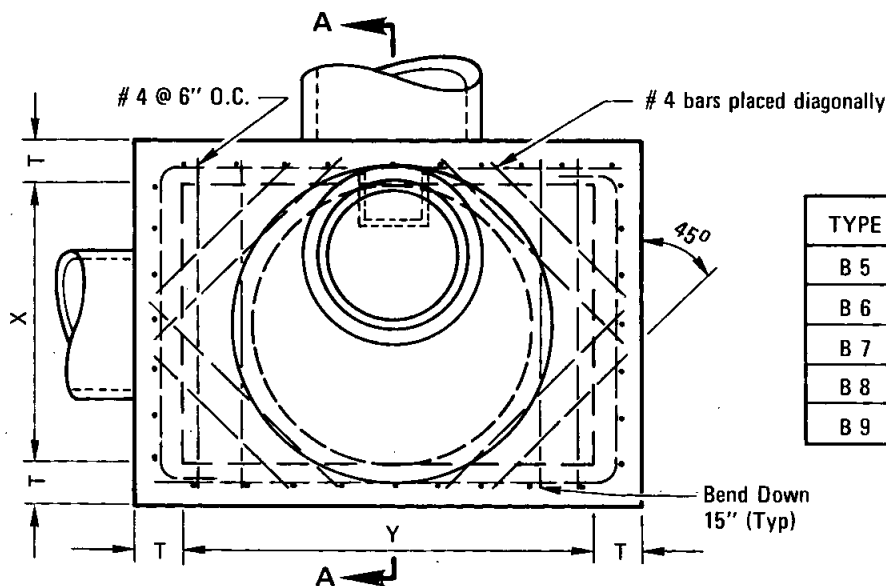
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. Concrete base shall be 564 - C - 3000.
3. All precast components shall be reinforced with 1/4" diameter steel, wound spirally on 4" centers.
4. All joints shall be set in Class C mortar.
5. Maintain 1 1/2" clear spacing between reinforcing and surface unless otherwise noted.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				STORM DRAIN CLEANOUT - TYPE A	<i>Allen A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
					DRAWING NUMBER D-9

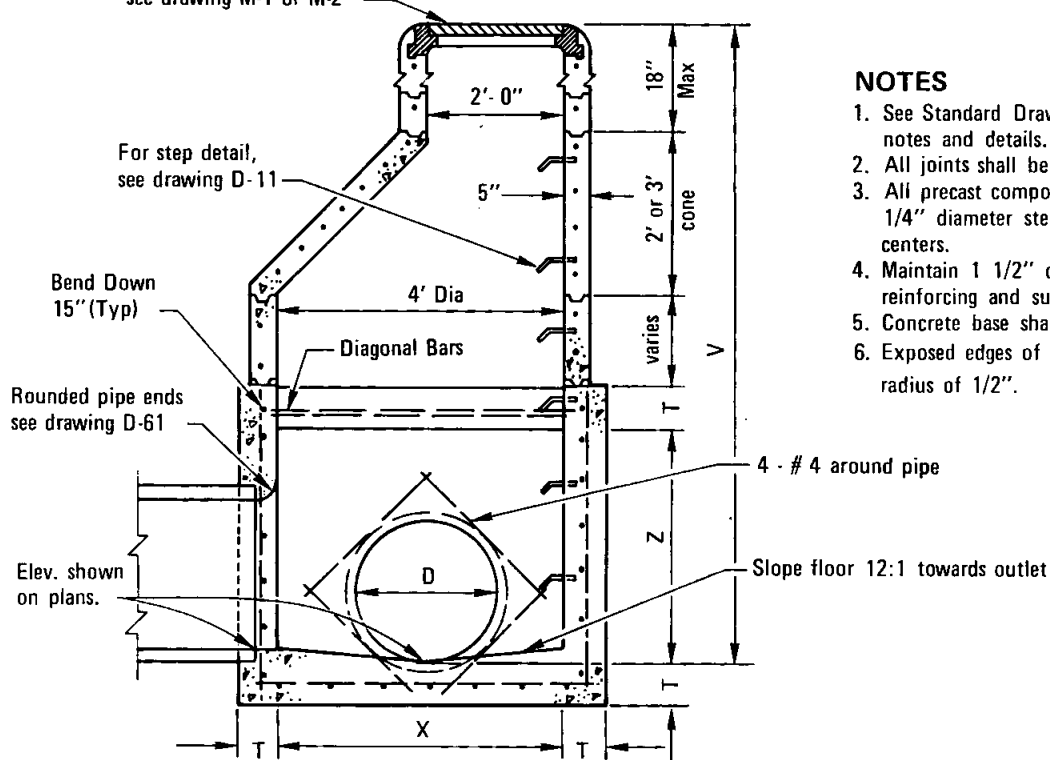


Manhole frame and cover
see drawing M-1 or M-2

PLAN

TYPE	PIPE DIA	X	Y	Z
B 5	up to 51"	4'	5'	5'
B 6	54" to 60"	4'	6'	6'
B 7	63" to 69"	4'	7'	7'
B 8	72" to 81"	4'	8'	8'
B 9	84" to 90"	4'	9'	9'

Bend Down
15" (Typ)

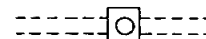


SECTION A-A

NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. All joints shall be set in Class C mortar.
3. All precast components shall be reinforced with 1/4" diameter steel wound spirally on 4" centers.
4. Maintain 1 1/2" clear spacing between reinforcing and surface.
5. Concrete base shall be 564 - C - 3000.
6. Exposed edges of concrete shall be rounded with a radius of 1/2".

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

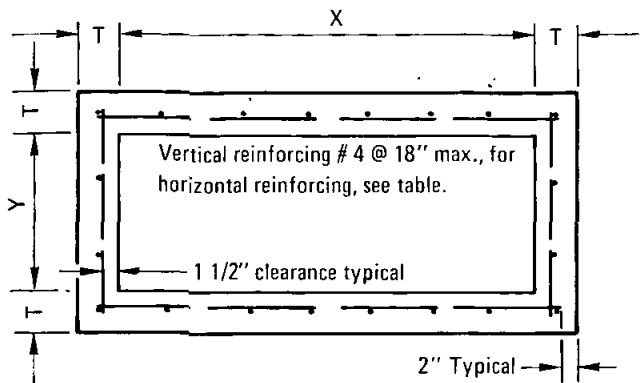
Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-10**

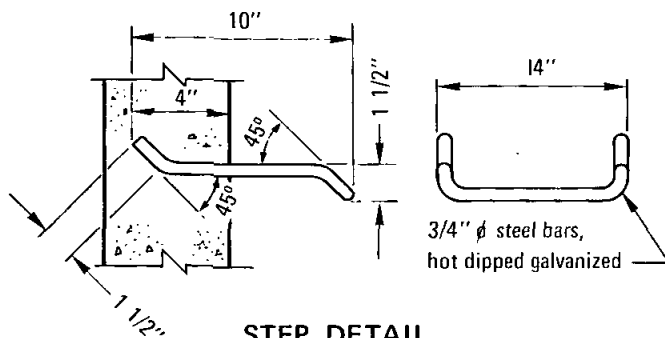
SAN DIEGO REGIONAL STANDARD DRAWING

STORM DRAIN CLEANOUT - TYPE B

Revision	By	Approved	Date



TYPICAL BOX SECTION



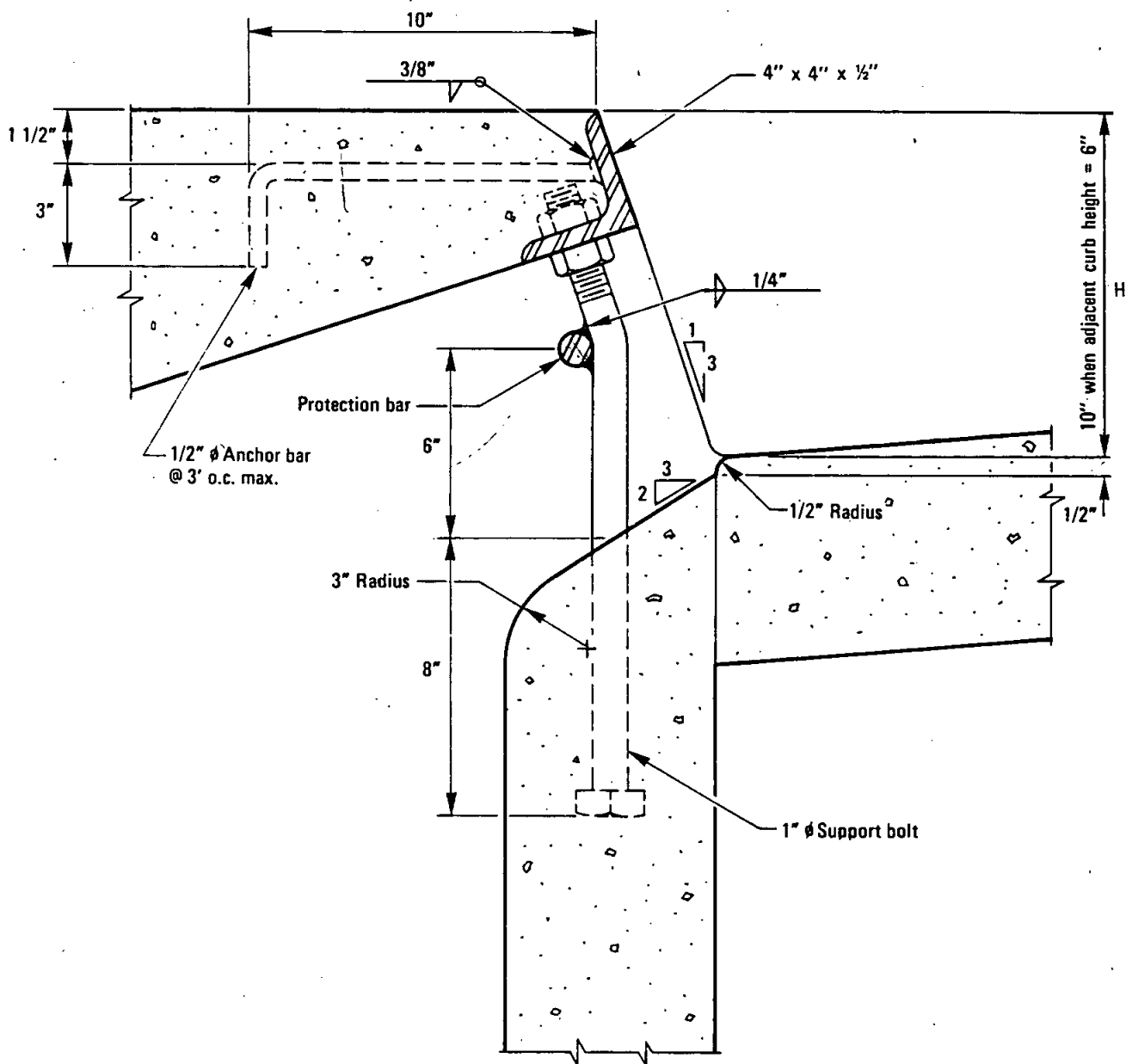
STEP DETAIL

BOX SECTION REINFORCEMENT			
MAXIMUM SPAN X or Y	DEPTH V	THICK- NESS T	HOR. & FLR. REINF.
3' - 0" to 4' - 0"	4' - 0"	6"	# 4 @ 18"
4' - 1" to 7' - 0"		6"	# 4 @ 12"
7' - 1" to 8' - 0"		6"	# 4 @ 8"
3' - 0" to 4' - 0"	4' - 1" to 8' - 0"	6"	# 4 @ 18"
4' - 1" to 5' - 0"		6"	# 4 @ 12"
5' - 1" to 6' - 0"		6"	# 4 @ 8"
6' - 1" to 8' - 0"	8' - 1" to 12' - 0"	6"	# 4 @ 6"
3' - 0" to 4' - 0"		6"	# 4 @ 15"
4' - 1" to 5' - 0"		8"	# 4 @ 12"
5' - 1" to 6' - 0"	12' - 1" to 16' - 0"	8"	# 4 @ 8"
6' - 1" to 7' - 0"		8"	# 4 @ 6"
7' - 1" to 8' - 0"		8"	# 4 @ 6"
3' - 0" to 4' - 0"	16' - 1" to 20' - 0"	8"	# 5 @ 8"
4' - 1" to 5' - 0"		8"	# 4 @ 12"
5' - 1" to 6' - 0"		10"	# 4 @ 12"
6' - 1" to 7' - 0"	20' - 1" to 24' - 0"	10"	# 4 @ 8"
7' - 1" to 8' - 0"		10"	# 4 @ 6"
3' - 0" to 4' - 0"		10"	# 4 @ 6"
4' - 1" to 5' - 0"	24' - 1" to 28' - 0"	10"	# 4 @ 12"
5' - 1" to 6' - 0"		10"	# 4 @ 8"
6' - 1" to 7' - 0"		10"	# 4 @ 6"
7' - 1" to 8' - 0"	28' - 1" to 32' - 0"	10"	# 4 @ 6"
3' - 0" to 4' - 0"		12"	# 5 @ 8"
4' - 1" to 5' - 0"		12"	# 5 @ 8"

NOTES

- Concrete shall be 564 - C - 3000 unless otherwise noted.
- Reinforcing steel shall comply with this drawing unless otherwise specified.
- Reinforcing steel shall be intermediate grade deformed bars conforming to latest ASTM specifications.
- Bends shall be in accordance with latest ACI code.
- Minimum splice length for reinforcing shall be 30 diameters.
- Floor shall have a wood trowel finish and, except where used as junction boxes, shall have a minimum slope of 1" per foot toward the outlet.
- Depth V is measured from the top of the structure to the flowline of the box.
- Wall thickness and reinforcing steel required may be decreased in accordance with table above.
- Wall thickness shall be stepped on the outside of the box.
- When the structure depth V exceeds 4', steps shall be cast into the wall at 15 inch intervals from 15" above floor to within 12 inches of top of structure. Where possible place steps in wall without pipe opening, otherwise over opening of smallest diameter.
- Alternate step may be an approved steel reinforced polypropylene step.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Notes	J	D.S.	7-79			
				INLETS AND CLEANOUTS NOTES AND DETAILS		<i>Allen A. Kerschman</i> Dec. 1975 Coordinator R.C.E. 19807 Date
						DRAWING NUMBER D-11



NOTES:

1. Face angle shall be cast into structure continuous for the full length "L".
2. All exposed metal parts to be hot-dipped galvanized after fabrication.
3. When curb height (H) exceeds 10" install 1" ϕ steel protection bar.
4. Install additional bars at 3 1/2" clear spacing above first bar when opening exceeds 13".
5. When curb inlet opening length exceeds 8' install 1" ϕ steel support bolts, spaced at not more than 5' o.c.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

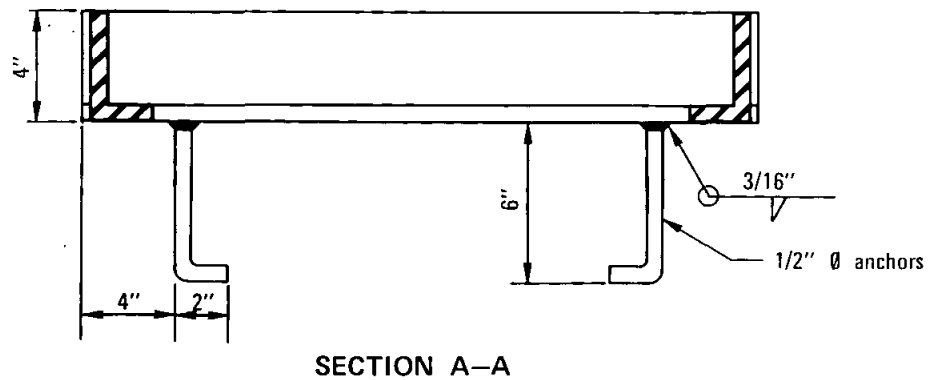
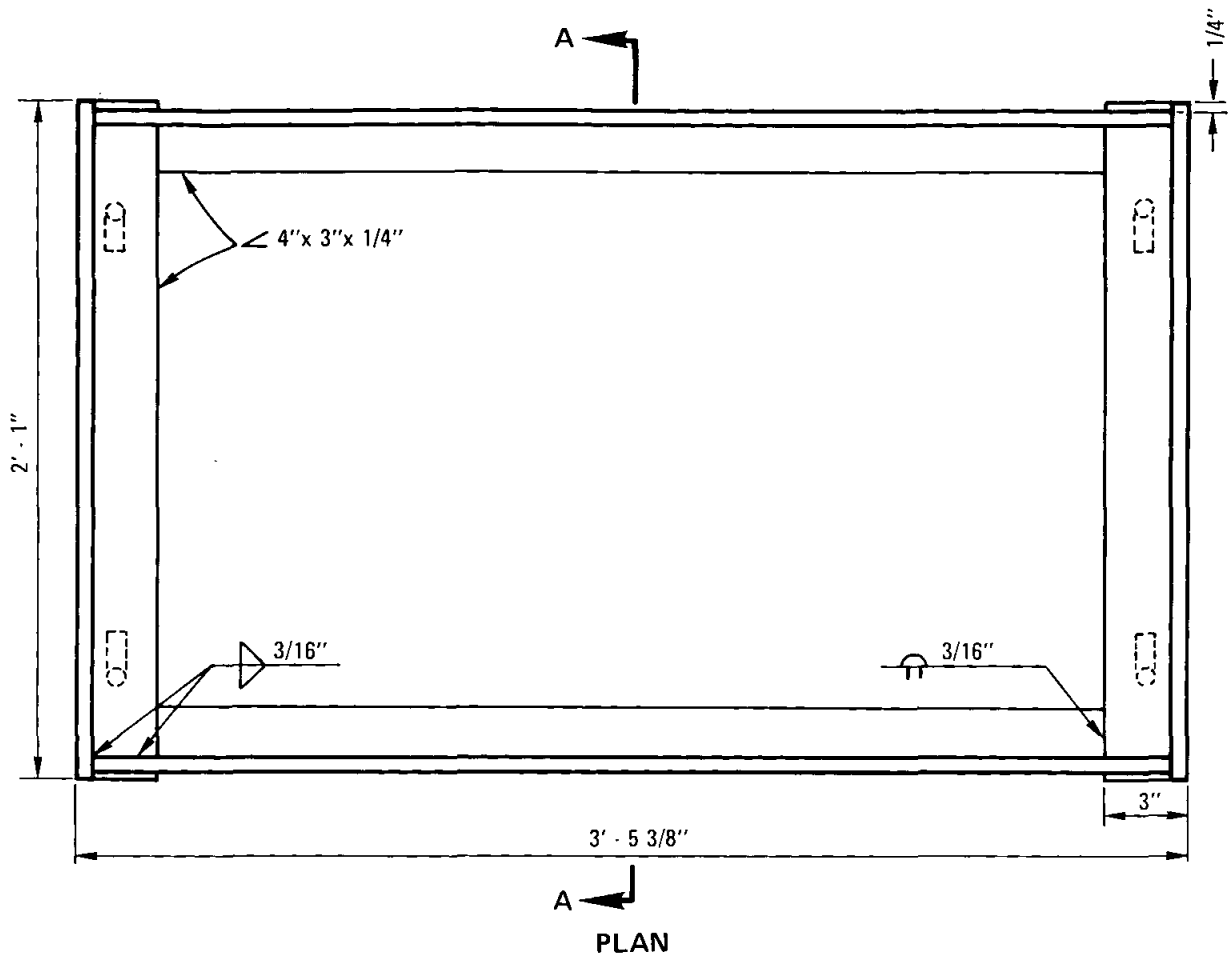
Allen D. Keshner Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

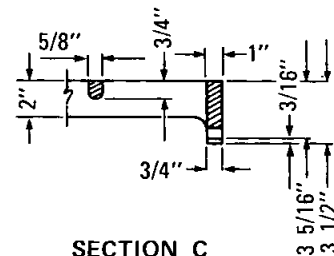
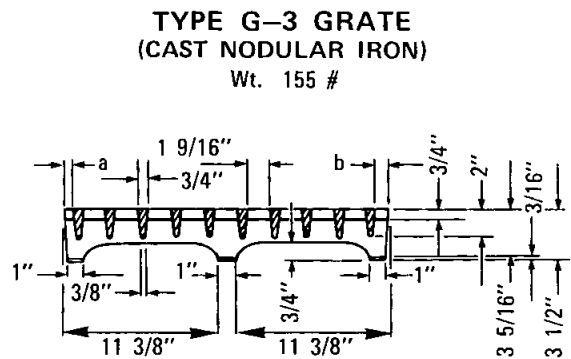
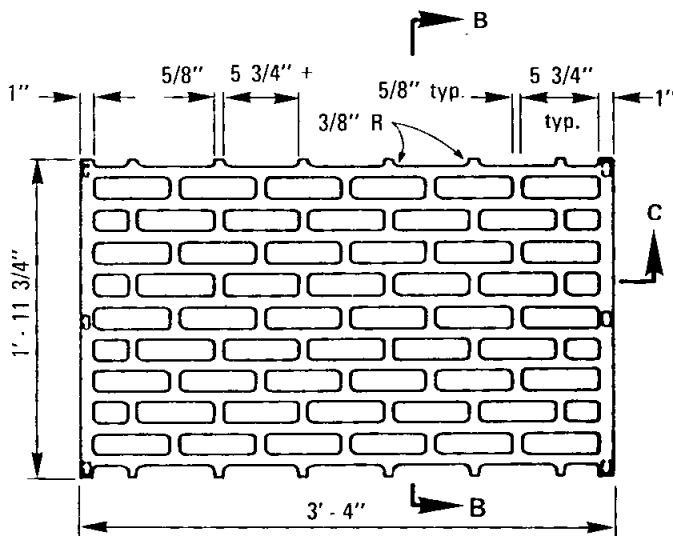
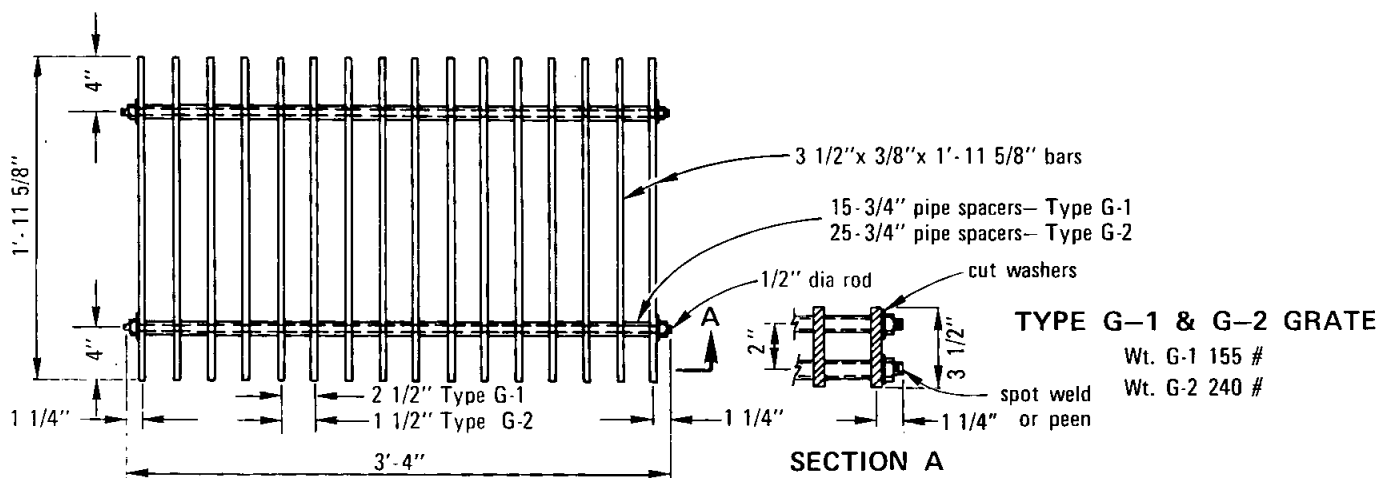
CURB INLET OPENING

Revision	By	Approved	Date
Angle	<i>SC</i>	<i>D.S.</i>	<i>7.7.9</i>
Note 3	<i>SC</i>	<i>D.S.</i>	<i>1-80</i>

DRAWING
NUMBER **D-12**



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allen G. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
				WELDED STEEL GRATE FRAME	DRAWING NUMBER D-13



NOTES:

1. Hot dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.
3. Type G-1 and G-2 grates are not to be used in areas subject to bicycle traffic.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen S. A. Kuehn Dec. 1975
Coordinator R.C.L. 19807 Date

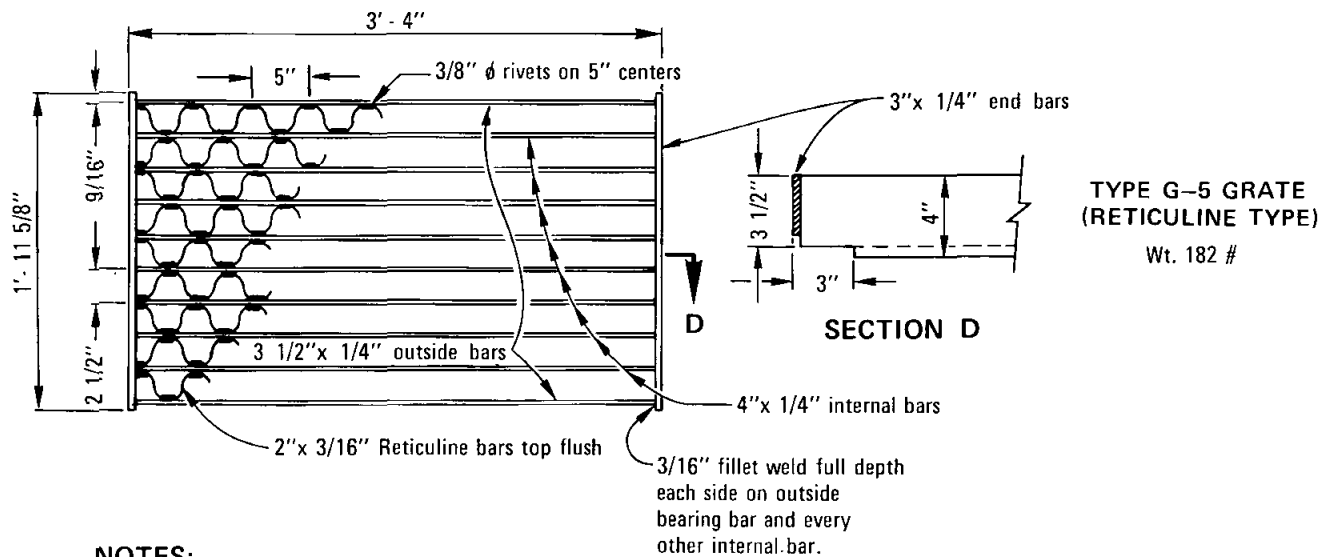
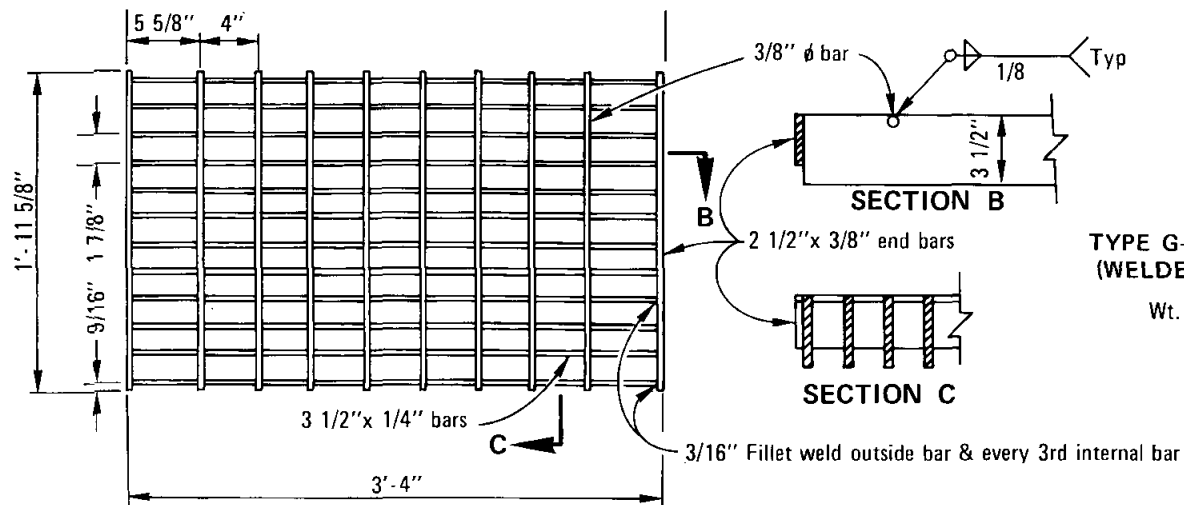
DRAWING
NUMBER

D-14

SAN DIEGO REGIONAL STANDARD DRAWING

**DRAINAGE STRUCTURE GRATES
TYPES G1, G2 AND G3**

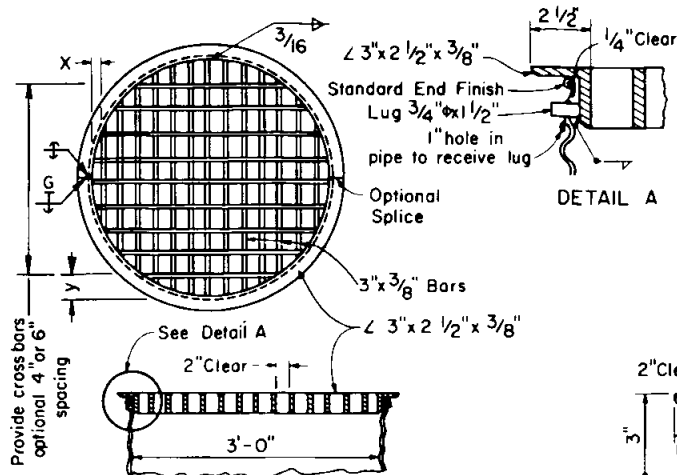
Revision	By	Approved	Date
Sect B-B	<i>D.S.</i>	<i>D.S.</i>	7-79
Sect C	<i>D.S.</i>	<i>D.S.</i>	7-79



NOTES:

1. Hot dip galvanize all parts after fabrication.
2. Dimensions to Centerline of bars unless otherwise noted.

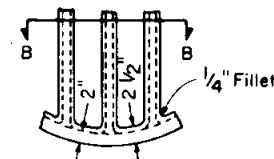
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				DRAINAGE STRUCTURE GRATES TYPES G4 AND G5		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	D-15



GRATE DETAILS

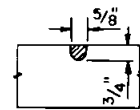
DETAIL A

ALTERNATIVE CAST NODULAR
IRON GRATE OR CAST STEEL



3/8" ϕ Cross bars may be fillet welded, resistance welded or electroforged to bearing bars.

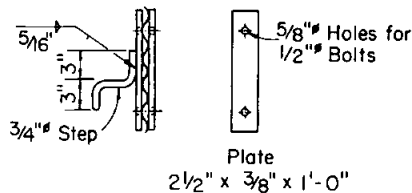
CROSS BAR DETAIL
GRATE (WELDED STEEL)



CROSS BAR DETAIL
ALTERNATIVE CAST
NODULAR IRON GRATE
OR CAST STEEL GRATE

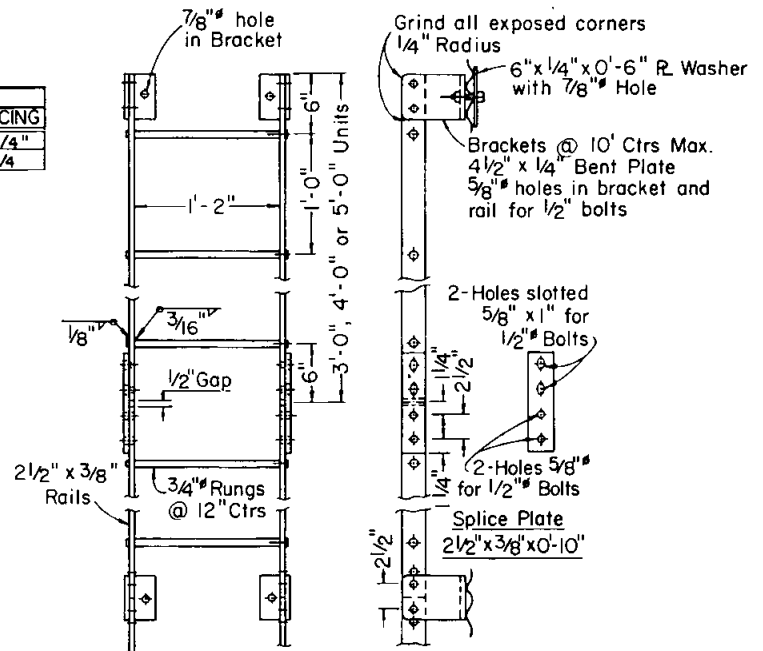
GRATE BAR SPACING TABLE

TYPE	NO. BARS	CLEAR BAR SPACING	X	Y	
				4" SPACING	6" SPACING
welded	15	2	9/16	3 3/4"	5 3/4"
Cast	13	2	2 1/8	3 3/4"	5 3/4"



STEP DETAIL

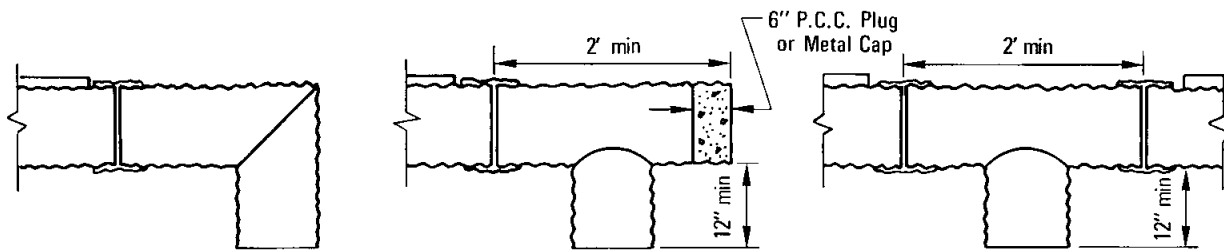
H = 3' - 6" to 4' - 11"



LADDER DETAIL

H = 5' - 0" or GREATER

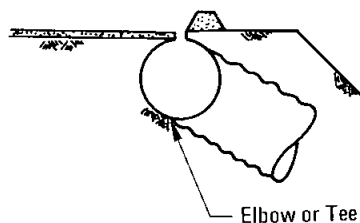
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
CORRUGATED STEEL PIPE INLETS DETAILS				<i>Alfred A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date			
				DRAWING NUMBER D-17			



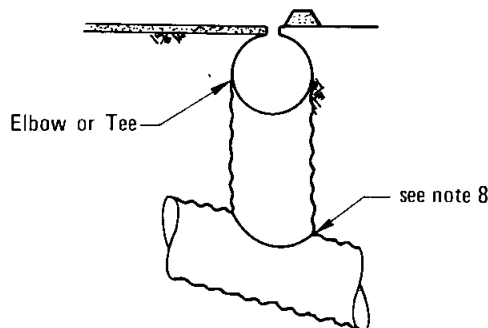
ELBOW

TEE

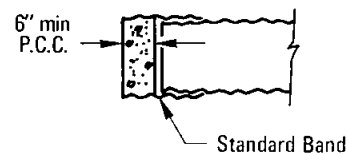
TEE-SAG CONDITION



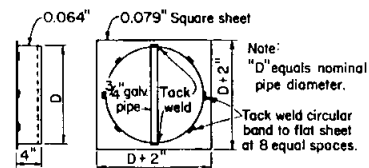
OVERSIDE DRAIN



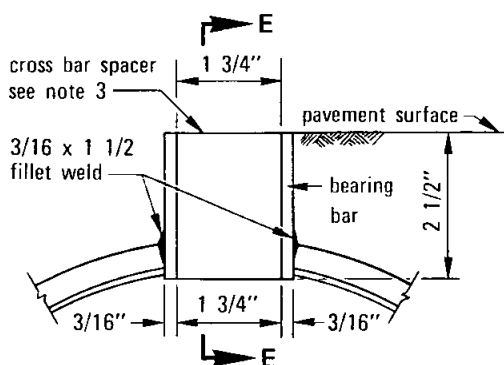
RISER



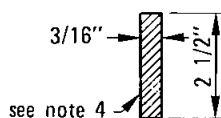
BAND PLUG



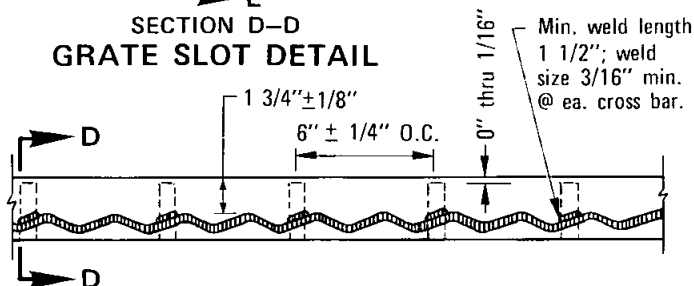
METAL CAP DETAIL



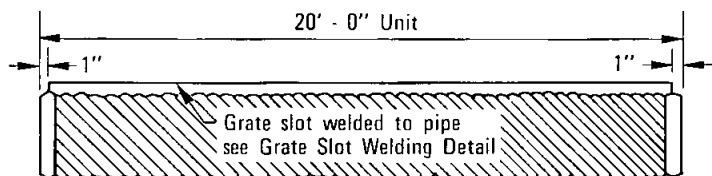
SECTION D-D
GRATE SLOT DETAIL



SECTION E-E



GRATE SLOT WELDING DETAIL



GRATE SLOT DRAIN

NOTES

1. Drain seams may be riveted or resistance spotwelded at equal centers, continuous helical lock seam or helical welded seam.
2. Each drain section shall be assembled with standard coupling bands.
3. Cross bar spacer of grate shall be pressure fusion or plug welded to bearing bars in such a manner as to develop the strength of the cross bar spacer.
4. Cross bar spacer (Section E-E) may differ from that shown provided section area is equal or greater.
5. Grate material shall be a weldable grade of steel complying to the requirements of ASTM A 36.
6. The maximum variance from a straight line from the extreme top corners of the bearing bar shall be 1/2" in 20 feet.
7. Installation lengths shall be 10 feet or multiples thereof.
8. Either field joint sealed with a pliable mixture of sand, portland cement and emulsified asphalt (Mixture of 1 part portland cement, 3 - 5 parts sand and 1 1/2 parts SSI emulsified asphalt), or continuous weld.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

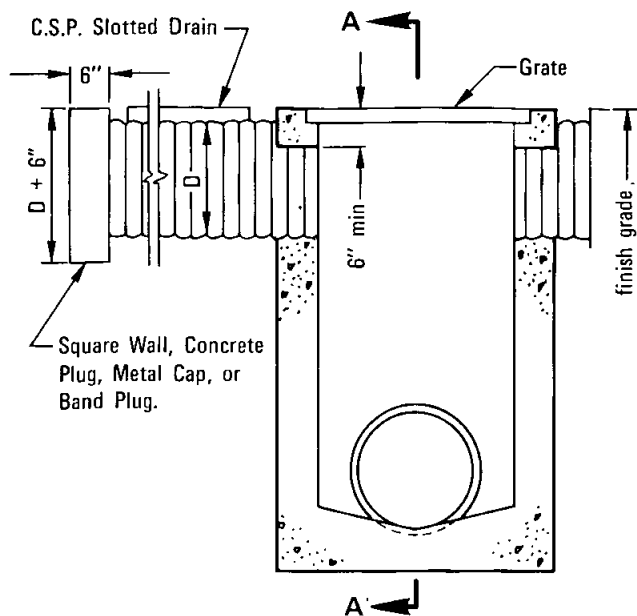
SAN DIEGO REGIONAL STANDARD DRAWING

**SLOTTED CORRUGATED STEEL PIPE DRAIN
12" THROUGH 24"**

DRAWING
NUMBER

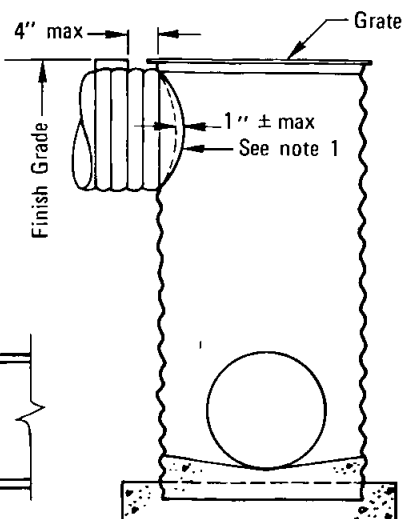
D-18

Revision	By	Approved	Date

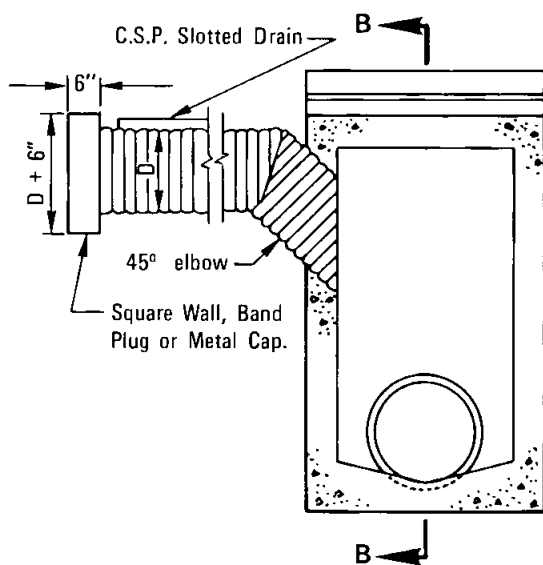


SECTION A-A

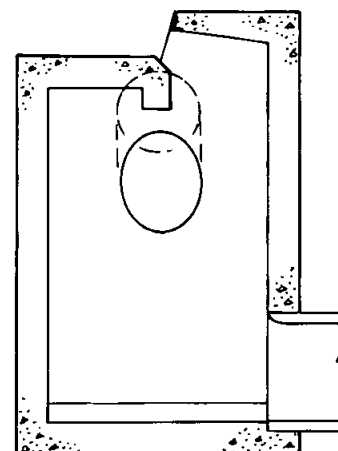
CATCH BASIN



C.S.P. INLET



SECTION B-B



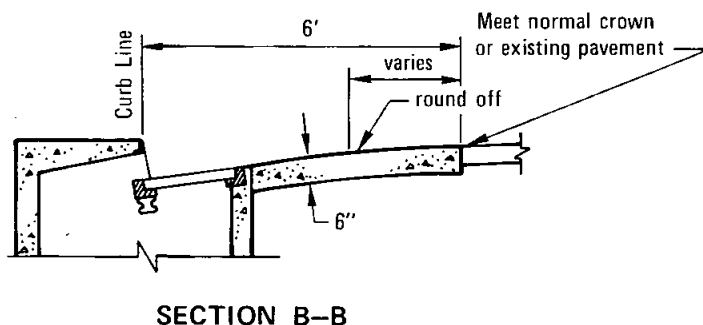
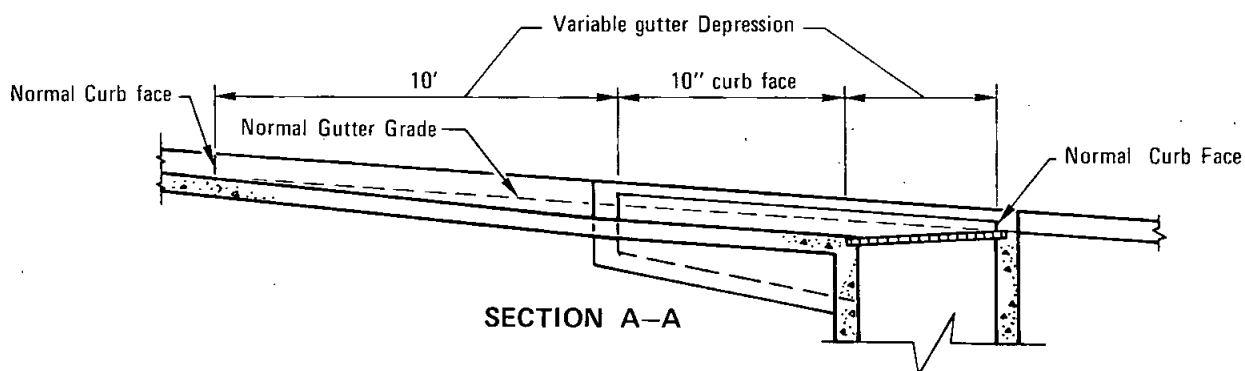
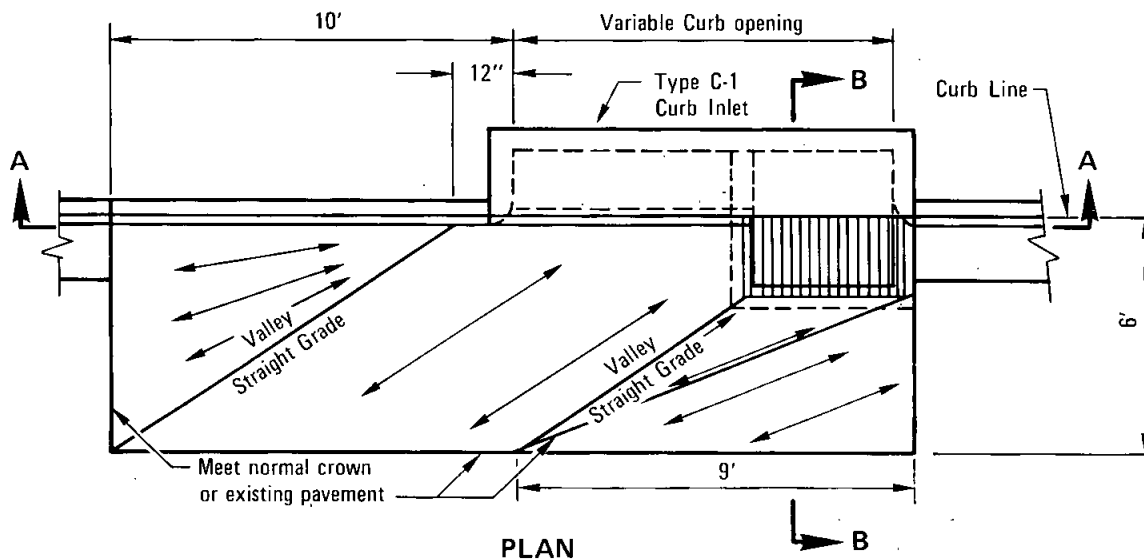
ALTERNATE
SECTION B-B

INLETS

NOTES

1. Either field joint with a pliable mixture of sand, portland cement and emulsified asphalt (mixture of 1 part portland cement, 3 - 5 parts sand, and 1 1/2 parts SSI emulsified asphalt), or continuous weld.
2. See Standard Drawing D - 18 for additional notes and details.

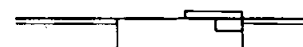
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
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				SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SLOTTED DRAIN CONNECTIONS TO STANDARD INLETS	RECOMMENDED BY THE SAN DIEGO REGION



NOTES:

1. Curb and apron to be placed monolithically.
2. Use of false header at valleys and slope break line is optional.
3. Extend vertical steel from inlet structure into concrete apron as required.
4. Screed Direction
5. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kersch *Dec. 1975*
Coordinator R.C.E. 19807 Date

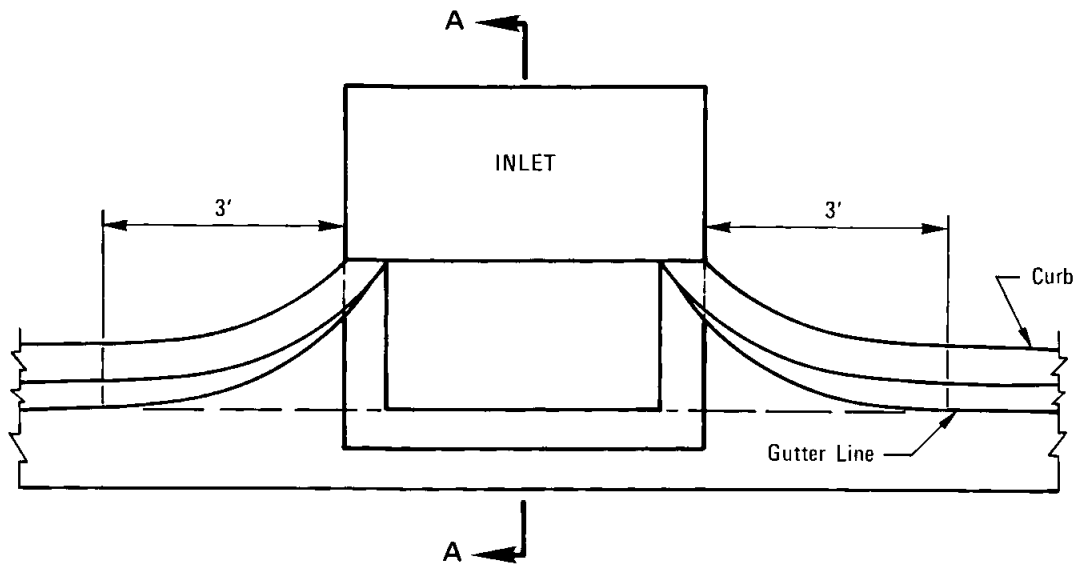
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE APRON FOR CURB INLET

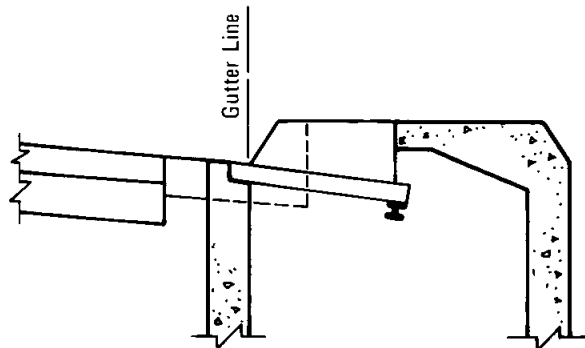
DRAWING
NUMBER

D-20

Revision	By	Approved	Date



PLAN

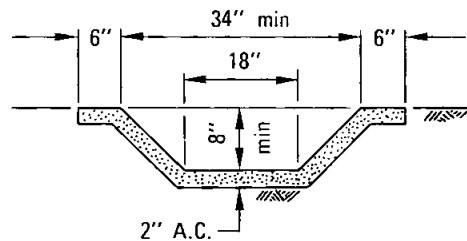
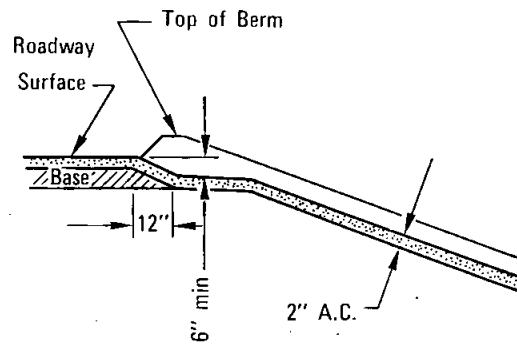
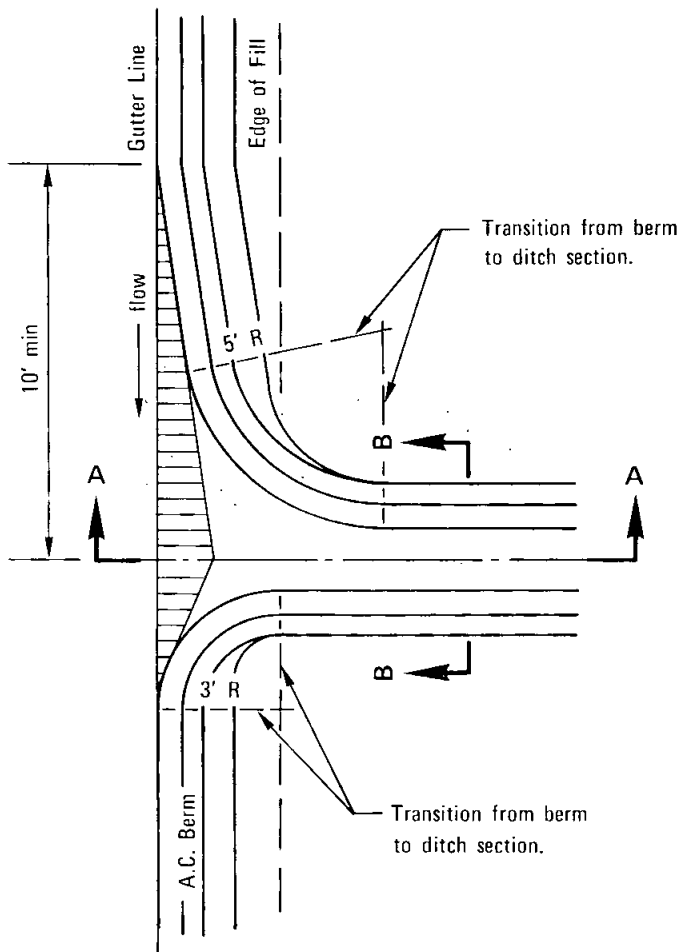


SECTION A-A

NOTES

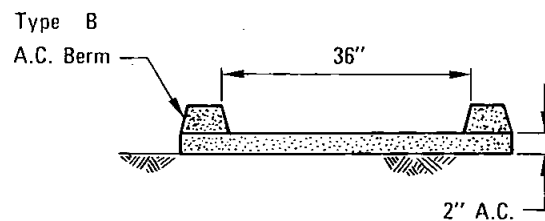
1. Fit curb to the face of inlet wall.
2. For use with Type C inlet only. See Standard Drawing D-3 for details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				CURB RETURN FOR MEDIAN STRIP INLETS		<i>Allan A. Kuchan</i> Dec. 1975 Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		D-21



NOTE

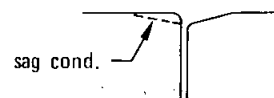
Cross - sectional area of ditch may be rounded, or trapezoidal.



NOTES

1. A.C. spillway may be used when fill is 10' or less, and where fill slope is 1 1/2:1 or flatter.
2. Use 10' min. length of gutter transition on each side of downdrain in sag condition.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

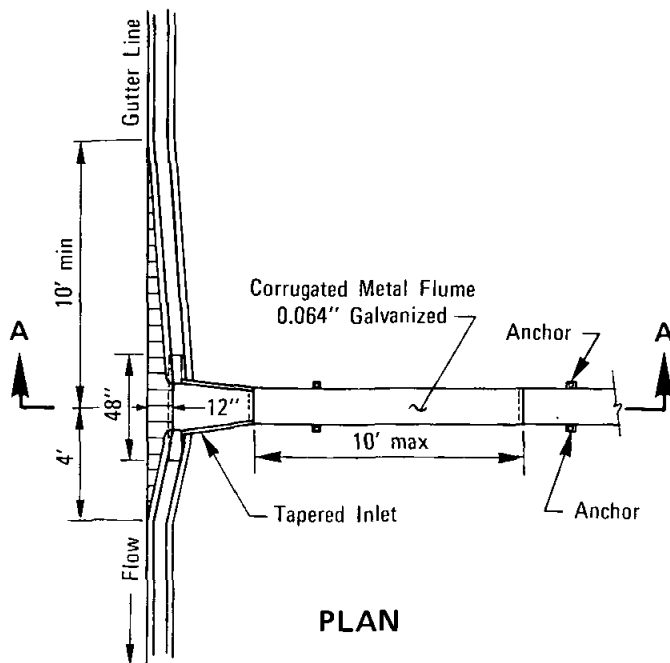
Chas. H. Keshner Dec. 1975
Coordinator R.C.L. 19807 Date

DRAWING
NUMBER **D-22**

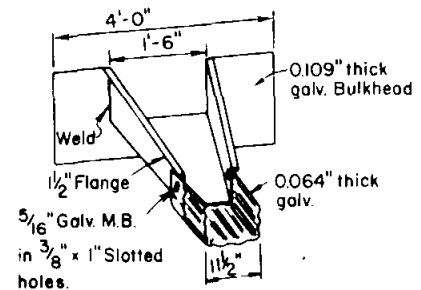
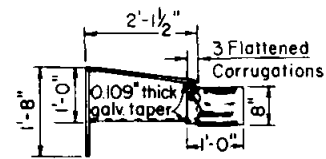
SAN DIEGO REGIONAL STANDARD DRAWING

ASPHALT CONCRETE SPILLWAY

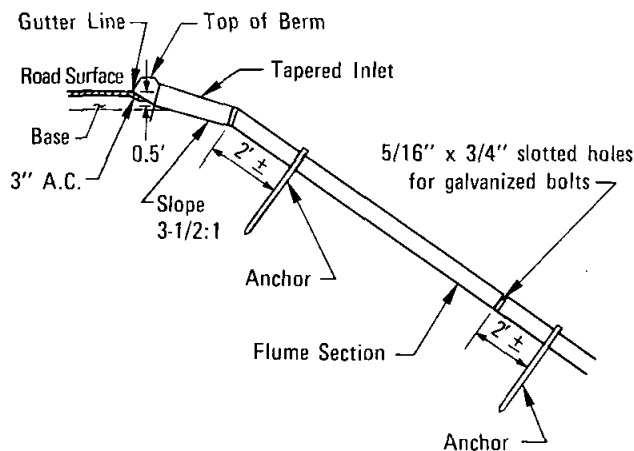
Revision	By	Approved	Date
Plan	<i>D.S.</i>	<i>D.S.</i>	7-79



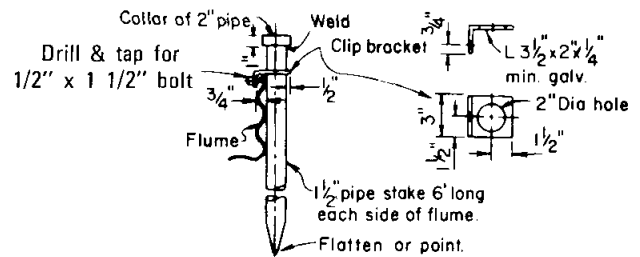
PLAN



TAPERED INLET



SECTION A-A

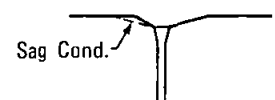


ANCHOR DETAIL

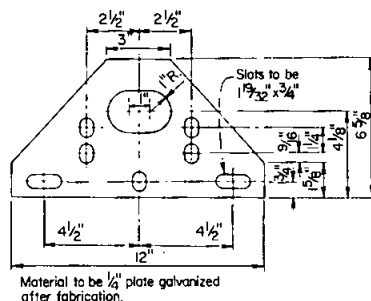
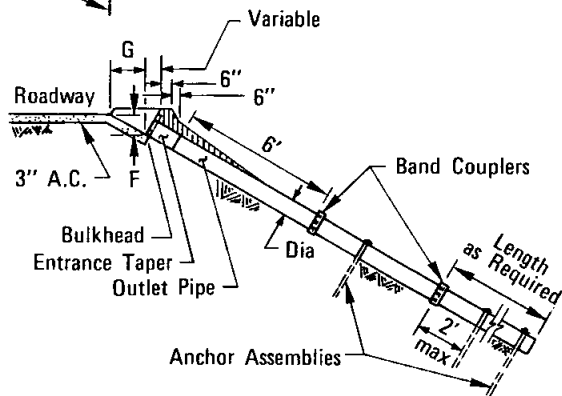
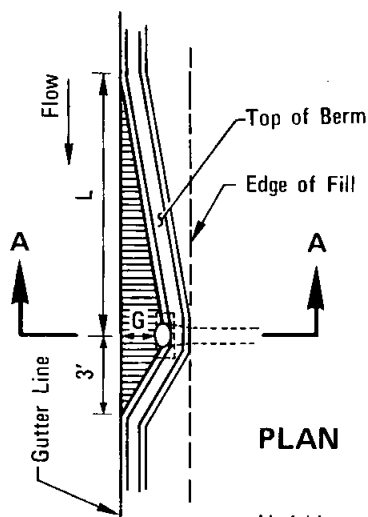
NOTES

1. Downdrain flume may be used where fill slope is 1 1/2 : 1 or flatter.
2. Use 10' min length of gutter transition on each side of downdrain in sag location.
3. All metal parts to be galvanized after fabrication.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TAPERED INLET AND DOWNDRAIN FLUME		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	D-23

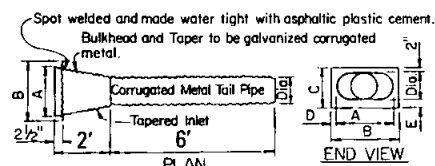


Dimensions to be as tabulated below for Assembly.

Dia	A	B	C	D	E	F	G	L
8"	16"	25 1/2"	15"	4 3/4"	5"	6"	18"	10'
12"	18"	25 1/2"	19"	3 3/4"	5"	9"	20"	15'
18"	24"	36"	26"	6"	6"	12"	24"	25'

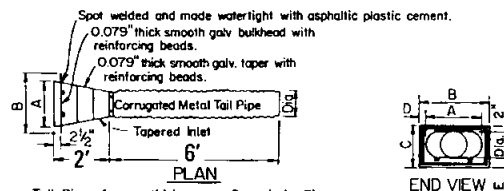
NOTES

1. All metal parts for anchor assemblies shall be galvanized after fabrication.
2. One anchor assembly required per length of pipe. When final length exceeds 10 ft. two anchors shall be required.

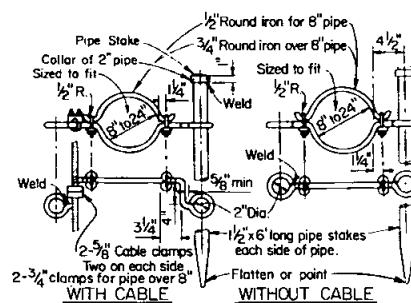


Bulkhead and Taper of same thickness as Tail Pipe with 0.079" Max.
Tail Pipe of same thickness as Downdrain Pipe.

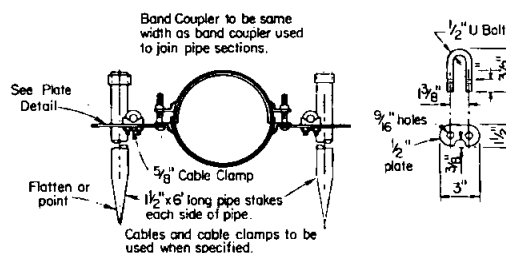
ENTRANCE TAPER— TYPE 1 ALTERNATIVE A



ENTRANCE TAPER—TYPE 1 ALTERNATIVE B



ANCHOR ASSEMBLY ALTERNATIVE—A



ANCHOR ASSEMBLY ALTERNATIVE—B

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman Dec. 1975
Coordinator R.C.E. 19807 Date

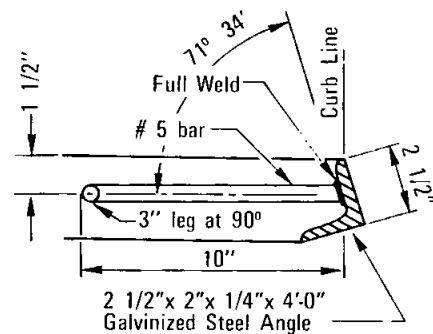
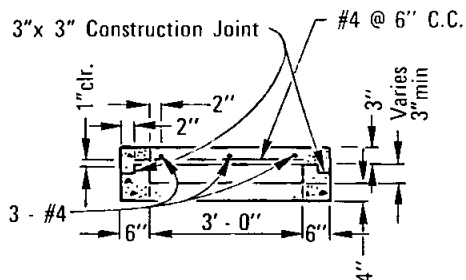
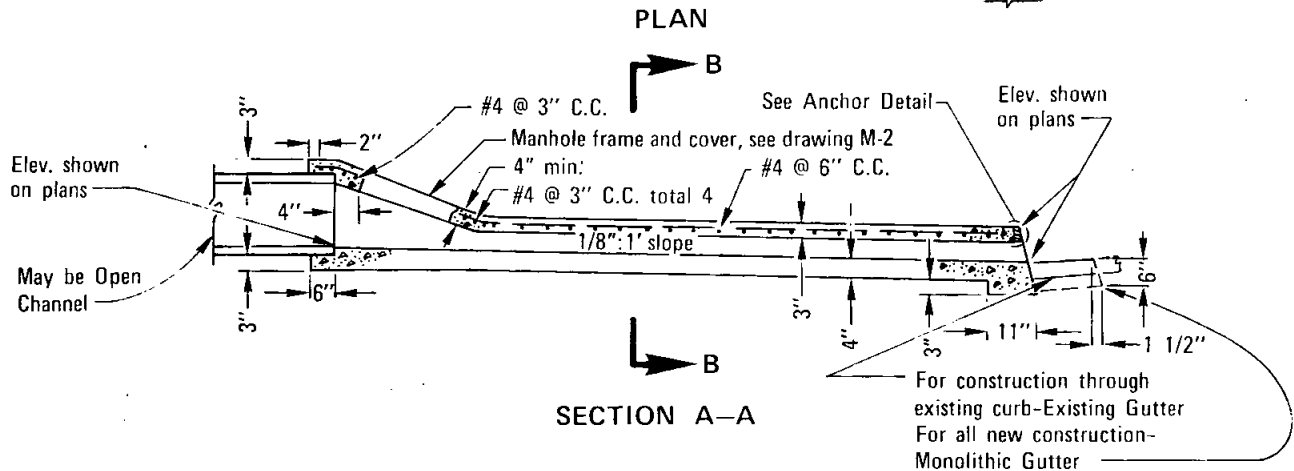
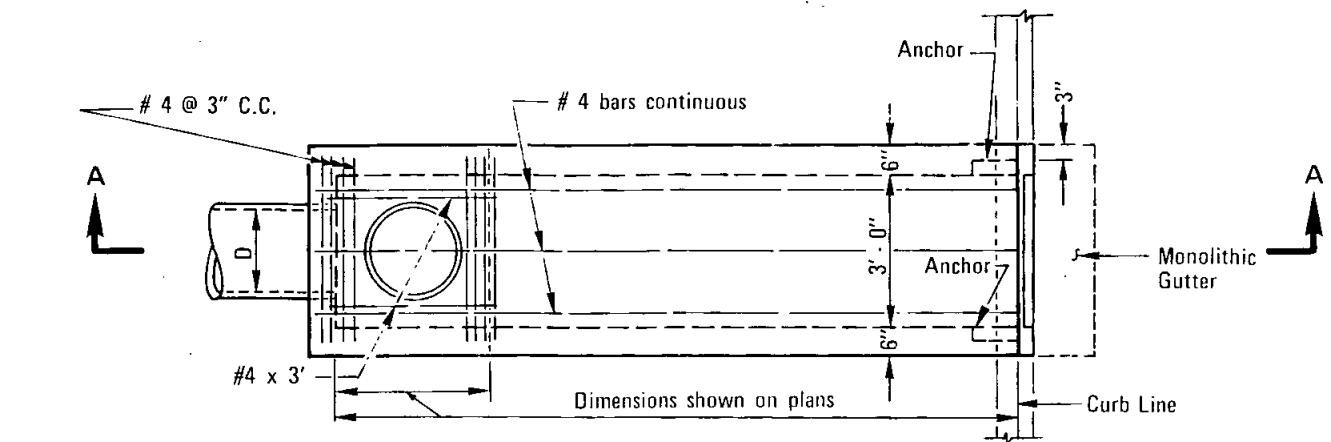
DRAWING
NUMBER

D-24

SAN DIEGO REGIONAL STANDARD DRAWING

ENTRANCE TAPER AND DOWNDRAIN PIPE

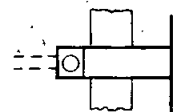
Revision	By	Approved	Date



NOTES

1. Concrete shall be 564-C-3000.
2. D=inside diameter of pipe or depth of channel.
3. Section to be sloped laterally with top conforming to the grades of the existing sidewalk and curb.
4. Manhole frame and cover may be deleted with open channel.
5. Trowel finish top surface and reproduce markings of existing sidewalk and curb.
6. Trowel finish floor of outlet.

LEGEND ON PLANS



Revision	By	Approved	Date
Bar Size	5/8"	D.S.	7-79

SAN DIEGO REGIONAL STANDARD DRAWING

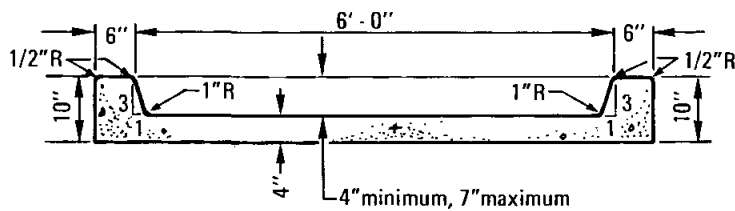
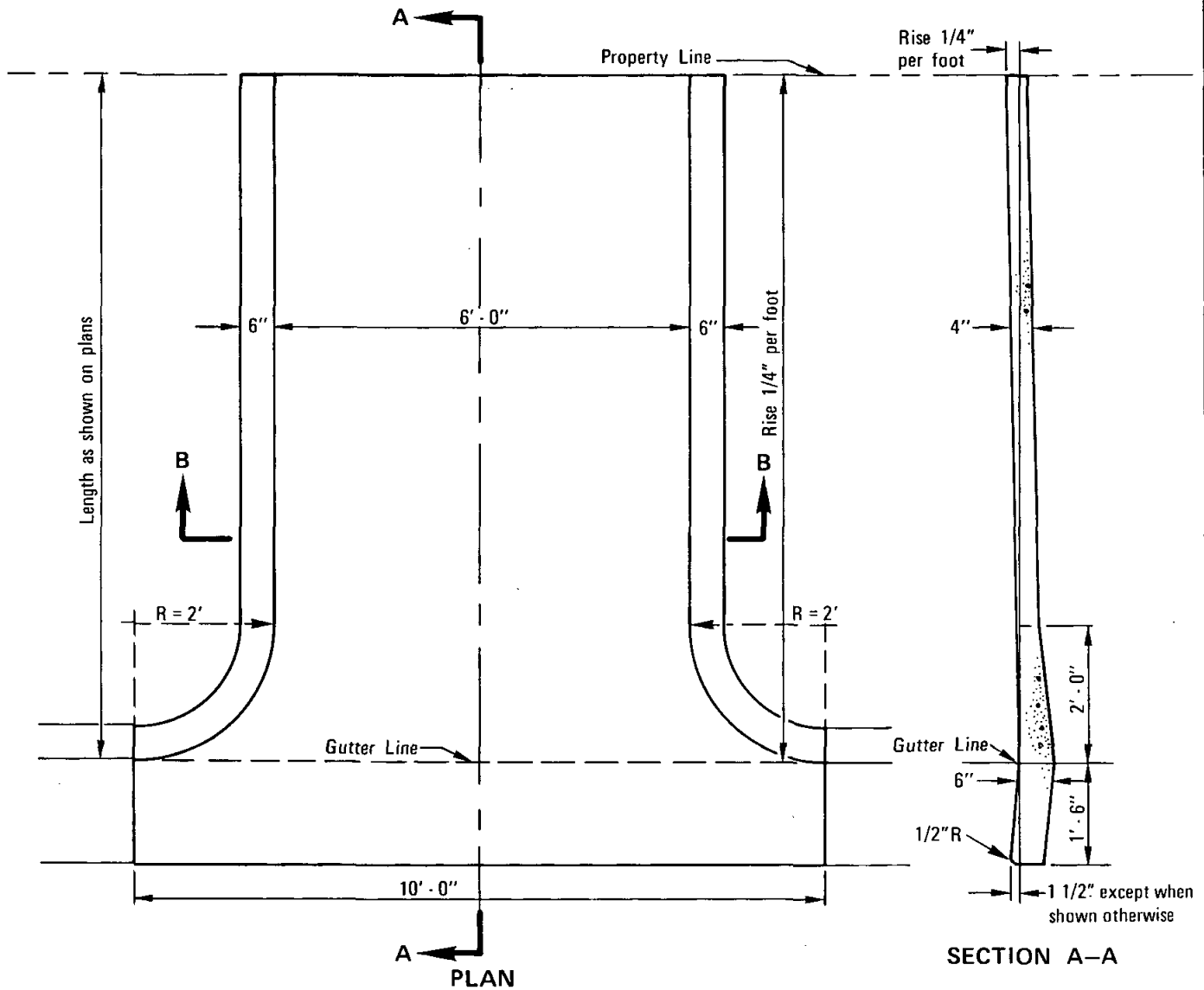
CURB OUTLET - TYPE A

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehnle Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER D-25

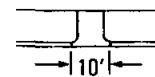
Length as shown on plans



NOTES

1. Not to be used in sidewalk areas.
2. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman Dec. 1975
Coordinator R.C.E. 19807 Date

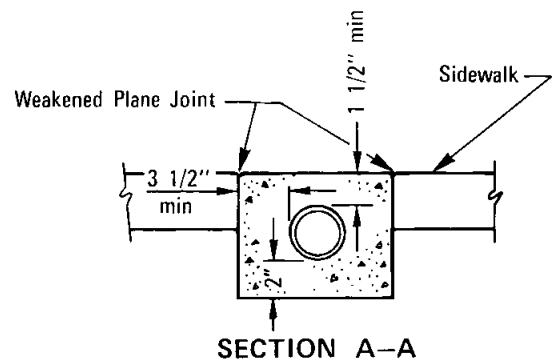
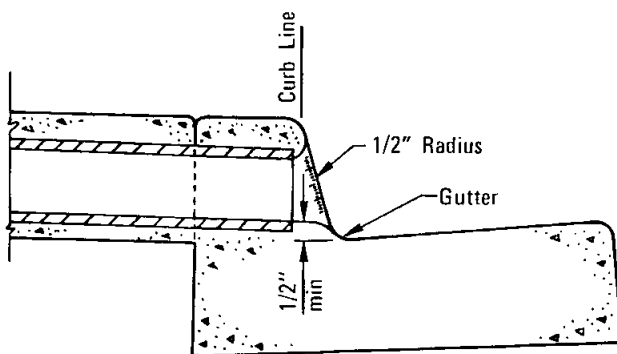
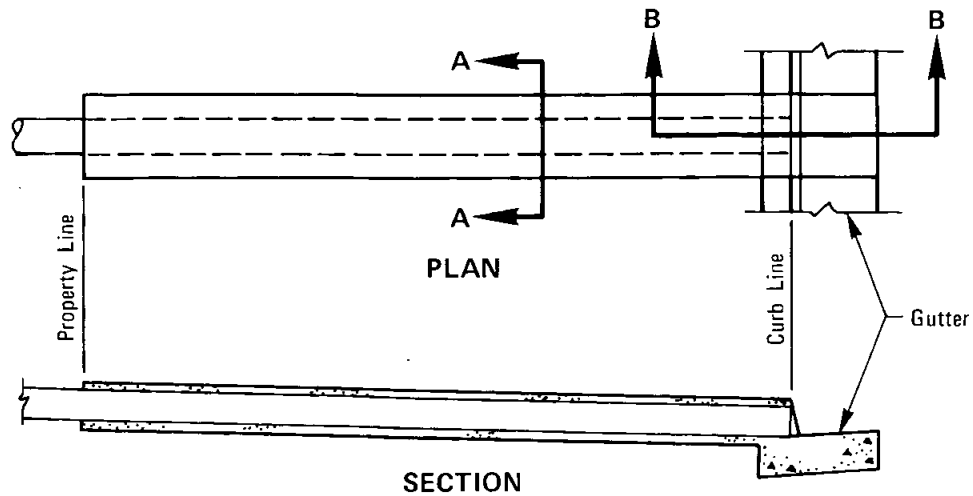
SAN DIEGO REGIONAL STANDARD DRAWING

CURB OUTLET - TYPE B

DRAWING
NUMBER

D-26

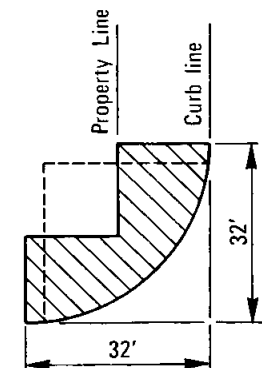
Revision	By	Approved	Date



APPROVED DRAIN PIPE SIZES	
3"	6" to 8" CURB FACE
4"	8" CURB FACE
6"	10" CURB FACE

NOTES

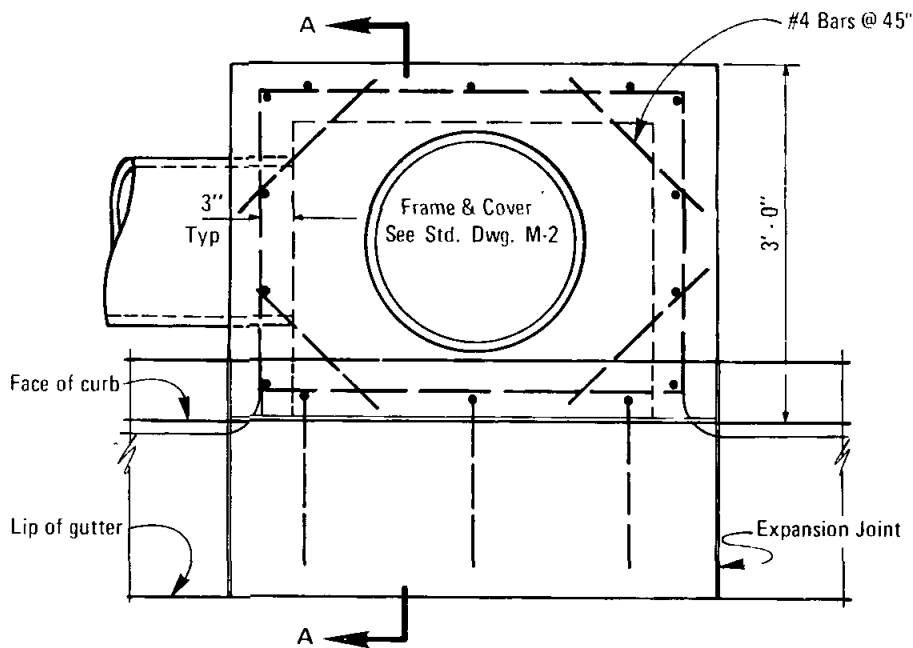
1. Pipe shall be one continuous length from property line to curb line.
2. Multiple pipes to be set a minimum distance of D/2 apart.
3. Concrete shall be 517-C-2500.
4. Pipe shall be circular asbestos cement, cast iron or rigid plastic.



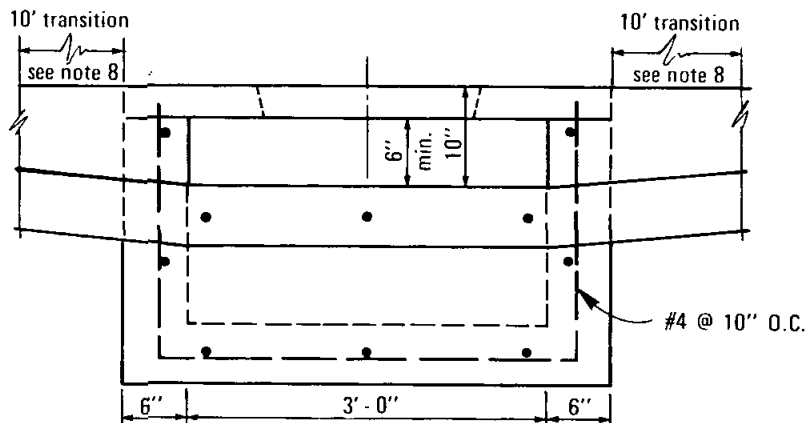
Drain shall not occupy
the hatched area

BLOCK CORNER

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
				SIDEWALK UNDERDRAIN PIPE	
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
				DRAWING NUMBER D-27	

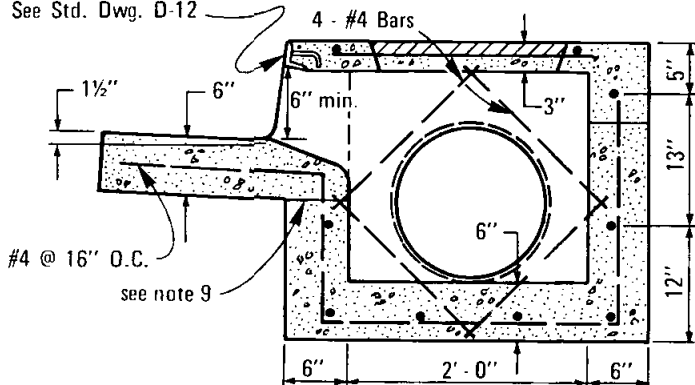


PLAN



ELEVATION

Galv. Steel Angle Cont. -
See Std. Dwg. D-12

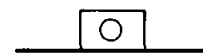


SECTION A-A

NOTES

1. See Standard Drawings D-11 & D-12 for additional notes and details.
2. This inlet shall not be used with any pipe over 18" I.D.
3. Surface of top slab shall be finished as specified for sidewalks in the Standard Specifications and shall drain towards streets at a slope of 1/4" per foot.
4. Exposed edges of concrete shall be rounded with a radius of 1/2".
5. Concrete gutter to match adjacent gutter.
6. Expansion joint material shall be placed at the ends of the inlet where the curb is to adjoin.
7. Provide 1/4" tooled groove in top slab in line with back of adjacent curb.
8. Transition to normal curb height in 10' unless noted otherwise.
9. Construction joint (Standard Drawing D-12) may be eliminated if inlet and gutter are constructed concurrently.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

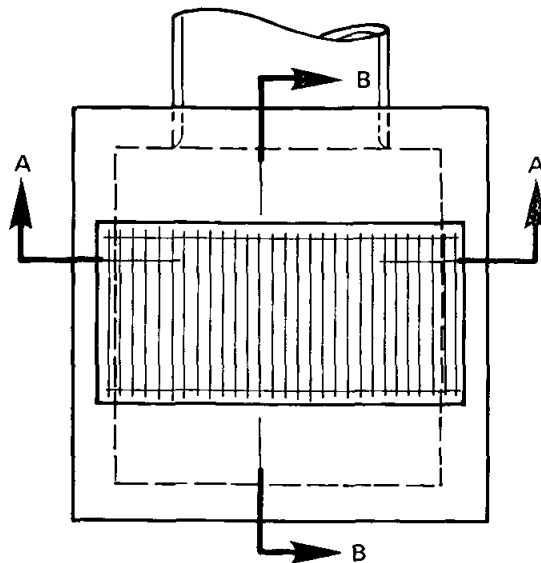
David J. Solomon July 1979
Coordinator R.C.E. 25291 Date

DRAWING
NUMBER **D-28**

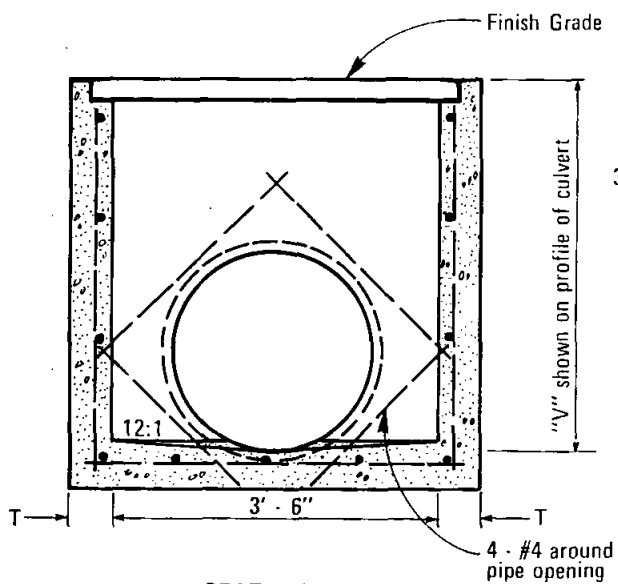
SAN DIEGO REGIONAL STANDARD DRAWING

CURB INLET, SHALLOW - TYPE H

Revision	By	Approved	Date

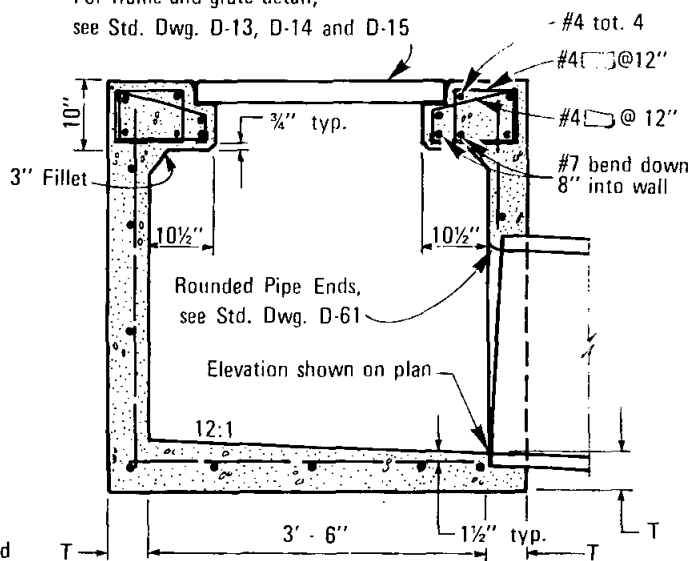


PLAN



SECTION A-A

For frame and grate detail,
see Std. Dwg. D-13, D-14 and D-15

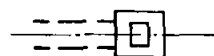


SECTION B-B

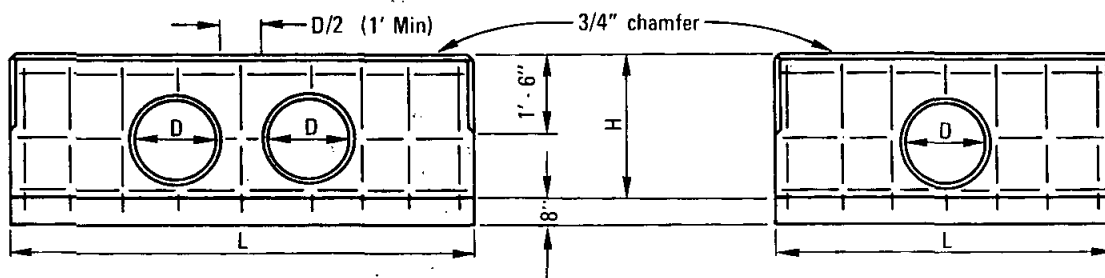
NOTES

1. See Standard Drawing D-11 for additional notes and details.
2. When "V" exceeds 4', steps shall be installed.

LEGEND ON PLANS

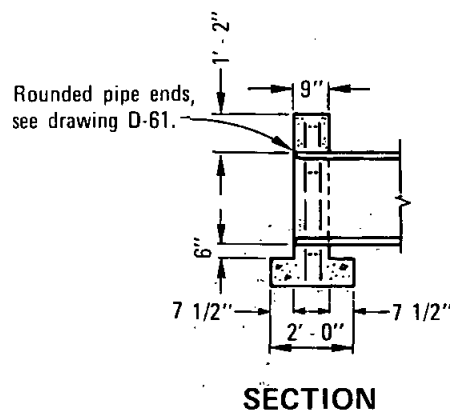


Revision	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
			CATCH BASIN - TYPE I		<i>David J. Salas</i> July 1979 Coordinator R.C.E. 25291 Date
					DRAWING NUMBER D-29



ELEVATION DOUBLE HEADWALL

ELEVATION SINGLE HEADWALL



SECTION

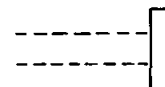
11/20/80 *60, 116*
10-88

D	H	SINGLE			DOUBLE		
		L	Steel Lbs.	Conc C. Y.	L	Steel Lbs.	Conc C. Y.
12"	2' - 8"	5' - 0"	35	0.60	8' - 0"	50	0.94
15"	2' - 11"	6' - 0"	40	0.75	9' - 6"	60	1.17
18"	3' - 2"	7' - 0"	50	0.91	10' - 6"	75	1.35
21"	3' - 5"	7' - 6"	60	1.02	11' - 6"	90	1.52
24"	3' - 8"	8' - 6"	75	1.20	12' - 6"	100	1.72
27"	3' - 11"	9' - 6"	85	1.39	14' - 0"	115	2.00
30"	4' - 2"	10' - 0"	85	1.52	15' - 0"	126	2.21
33"	4' - 5"	11' - 0"	100	1.73	16' - 0"	130	2.42
36"	4' - 8"	12' - 0"	105	1.95	17' - 0"	145	2.65
39"	4' - 11"	12' - 6"	130	2.09	18' - 0"	170	2.88
42"	5' - 2"	13' - 6"	140	2.34	19' - 0"	185	3.13
45"	5' - 5"	14' - 6"	150	2.60	20' - 0"	195	3.38
48"	5' - 8"	15' - 0"	160	2.75	21' - 0"	200	3.64
51"	5' - 11"	16' - 0"	180	3.03	22' - 6"	225	4.02
54"	6' - 2"	17' - 0"	190	3.31	23' - 6"	240	4.30

NOTES

- Concrete shall be 564-C-3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kersch *Dec. 1975*
Coordinator R.C.E. 19807 Date

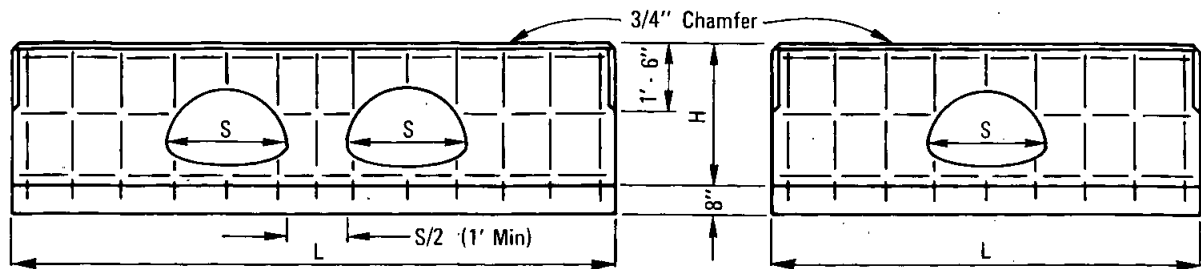
DRAWING
NUMBER

D-30

SAN DIEGO REGIONAL STANDARD DRAWING

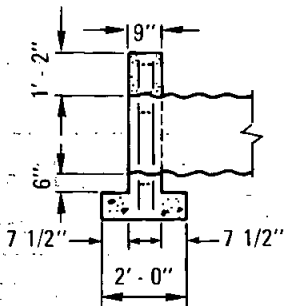
STRAIGHT HEADWALL - TYPE A
(CIRCULAR PIPE)

Revision	By	Approved	Date



ELEVATION DOUBLE HEADWALL

ELEVATION SINGLE HEADWALL



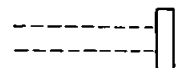
SECTION

C.S.P. ARCH SIZE	H	SINGLE			DOUBLE		
		L	Steel Lbs	Conc Cu. Yds.	L	Steel Lbs	Conc Cu. Yds.
18" x 11"	2' - 7"	5' - 6"	37	0.64	8' - 0"	52	.91
21" x 15"	2' - 11"	6' - 6"	45	0.80	10' - 0"	60	1.22
24" x 18"	3' - 2"	7' - 6"	50	0.96	11' - 6"	70	1.45
28" x 20"	3' - 4"	8' - 6"	60	1.12	13' - 6"	90	1.76
35" x 24"	3' - 8"	10' - 6"	85	1.47	15' - 6"	120	2.16
42" x 29"	4' - 1"	12' - 6"	110	1.76	18' - 0"	145	2.57
49" x 33"	4' - 5"	14' - 6"	130	2.26	21' - 0"	170	3.13
57" x 38"	4' - 10"	17' - 0"	155	2.81	24' - 6"	210	3.86
64" x 43"	5' - 3"	19' - 0"	175	3.31	27' - 0"	230	4.42
71" x 47"	5' - 7"	21' - 0"	195	3.81	30' - 0"	255	5.09

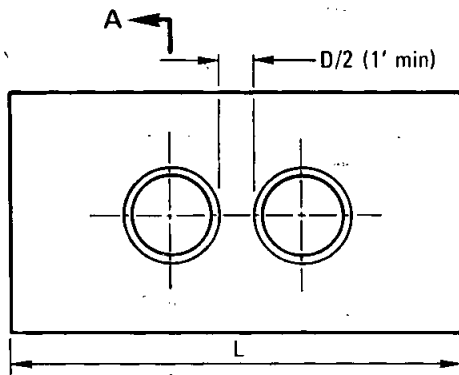
NOTES

- Concrete shall be 564-C-3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.

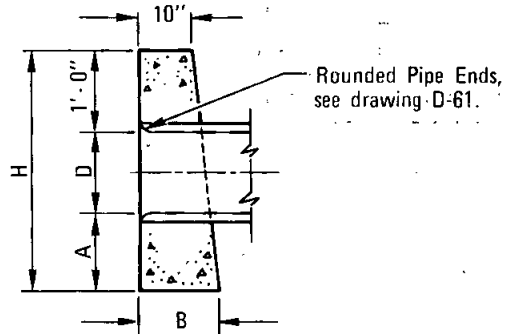
LEGEND ON PLANS



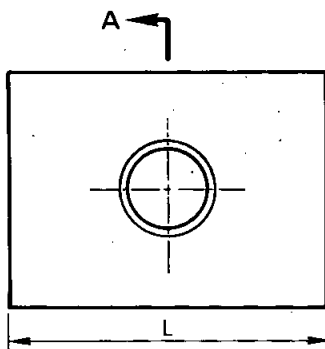
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING STRAIGHT HEADWALL - TYPE A (C.S.P.-ARCH)	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allen A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
DRAWING NUMBER				D-31	



DOUBLE PIPE
ELEVATION



SECTION A-A



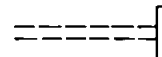
SINGLE PIPE
ELEVATION

D	A	B	H	SINGLE		DOUBLE	
				L	Conc. C.Y.	L	Conc. C.Y.
12"	2'-0"	1'-0"	4'-0"	4'-0"	.45	5'-8"	.62
15"	2'-0"	1'-1"	4'-3"	5'-0"	.63	7'-1"	.85
18"	2'-0"	1'-2"	4'-6"	6'-0"	.83	8'-6"	1.12
24"	2'-6"	1'-5"	5'-6"	8'-0"	1.54	11'-4"	2.09
30"	2'-6"	1'-9"	6'-0"	10'-0"	2.41	14'-2"	3.26
36"	3'-0"	2'-0"	7'-0"	12'-0"	3.74	17'-0"	5.05

NOTES

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

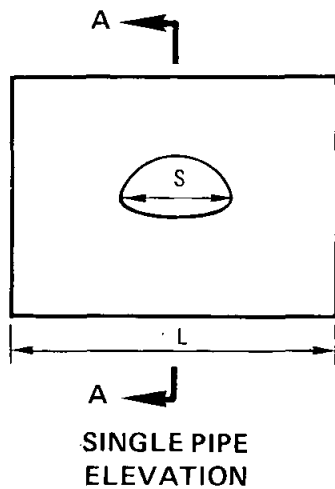
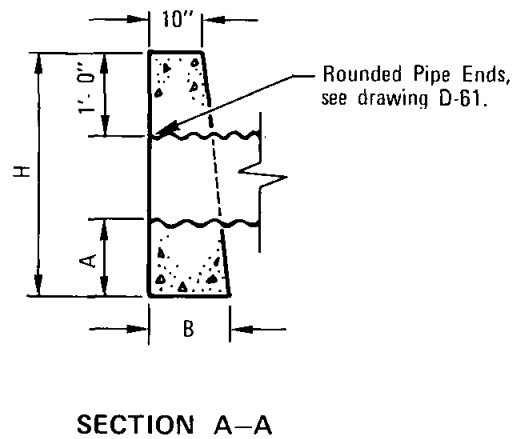
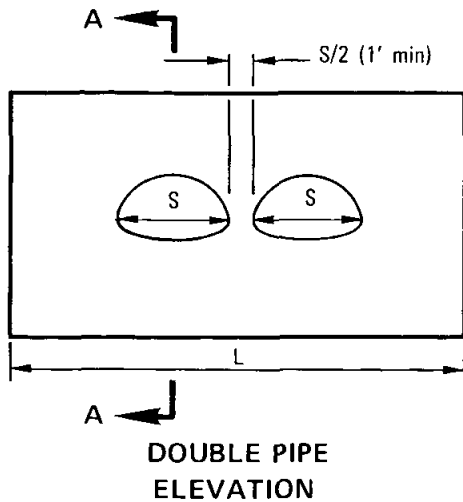
DRAWING
NUMBER

D-32

SAN DIEGO REGIONAL STANDARD DRAWING

STRAIGHT HEADWALL - TYPE B
(CIRCULAR PIPE)

Revision	By	Approved	Date

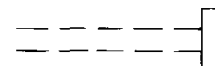


C.S.P. ARCH SIZE	A	B	H	SINGLE		DOUBLE	
				L	Conc C.Y.	L	Conc C.Y.
18"x 11"	2' - 0"	1' - 2"	3' - 11"	6'	0.83	7' - 3"	0.97
21"x 15"	2' - 0"	1' - 4"	4' - 1"	7'	1.08	9' - 8"	1.46
24"x 18"	2' - 0"	1' - 6"	4' - 4"	8'	1.41	11' - 6"	1.98
28"x 20"	2' - 6"	1' - 8"	5' - 0"	9'	1.97	12' - 6"	2.66
35"x 24"	2' - 6"	2' - 0"	5' - 4"	10'	2.56	14' - 5"	3.60

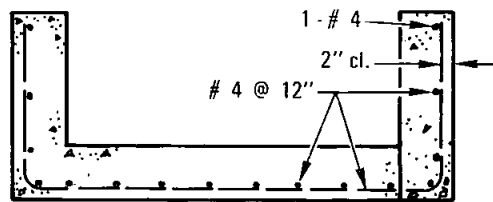
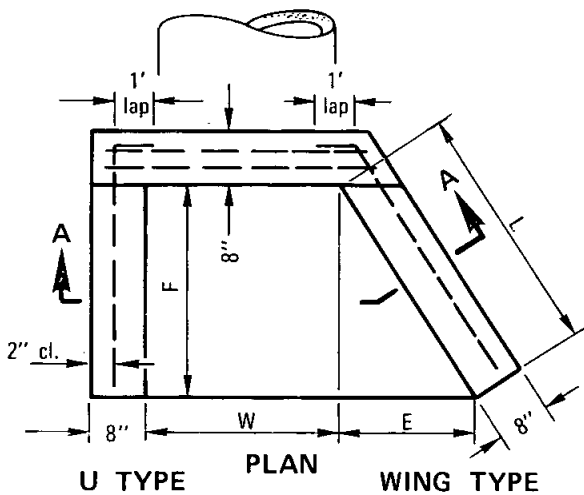
NOTES

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".

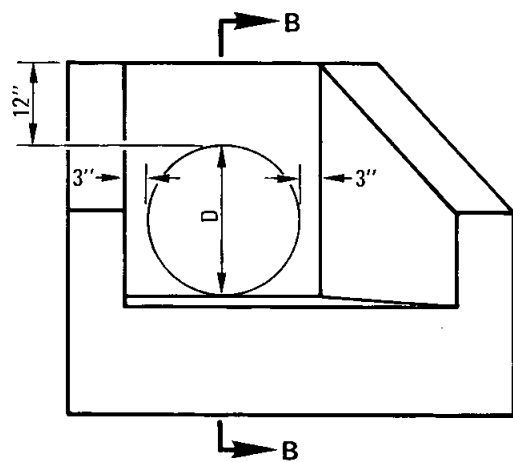
LEGEND ON PLANS



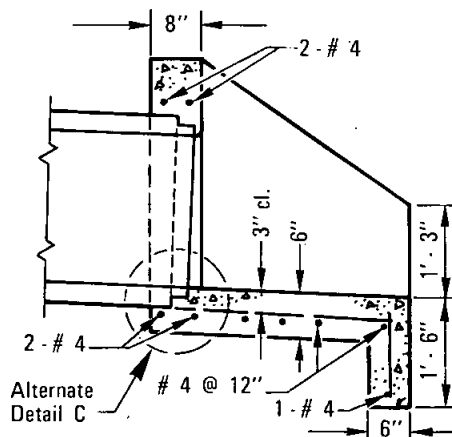
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				STRAIGHT HEADWALL - TYPE B [C.S.P. ARCH]		<i>Allard A. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER D-33	



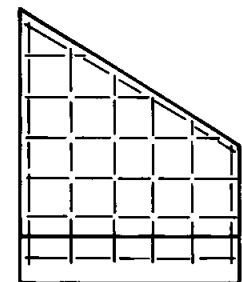
SECTION A-A



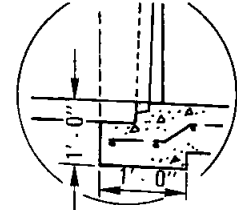
ELEVATION



SECTION B-B



WING WALL REINFORCING



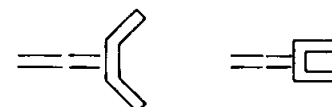
ALT. DETAIL C

DIA OF PIPE	DIMENSIONS			SINGLE PIPE						DOUBLE PIPE					
				W	U TYPE		WING TYPE		W	U TYPE		WING TYPE			
					CONC	STEEL	CONC	STEEL		CONC	STEEL	CONC	STEEL		
	C. Y.	LBS.	C. Y.		LBS.	C. Y.	LBS.	C. Y.		LBS.					
18"	2'-3 1/8"	1'-3"	1'-10 1/2"	2'-0"	0.55	35	0.63	43	As shown on plans	0.82	53	0.90	61		
24"	3'-1 7/8"	1'-9"	2'-7 1/2"	2'-6"	0.79	47	0.93	60		1.22	73	1.36	86		
30"	4'-0 5/8"	2'-3"	3'-4 1/2"	3'-0"	1.05	71	1.29	85		1.66	109	1.92	123		
36"	4'-11 1/2"	2'-9"	4'-1 1/2"	3'-6"	1.33	88	1.69	114		2.19	136	2.55	162		

NOTES:

1. Concrete shall be 564 - C - 3000.
2. Exposed corners to be chamfered 3/4".
3. Multiple pipes to be set a distance of D/2, with a 1' minimum between outside diameters of pipes.
4. Top of headwall shall be placed approximately parallel to profile grade when the grade is 3% or more.
5. Skewed pipes: Dimension W to be increased in width or length due to skew or multiple pipes.
6. For pipe wall thickness greater than 3" use alternate Detail-C.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

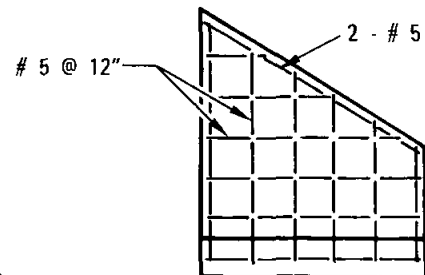
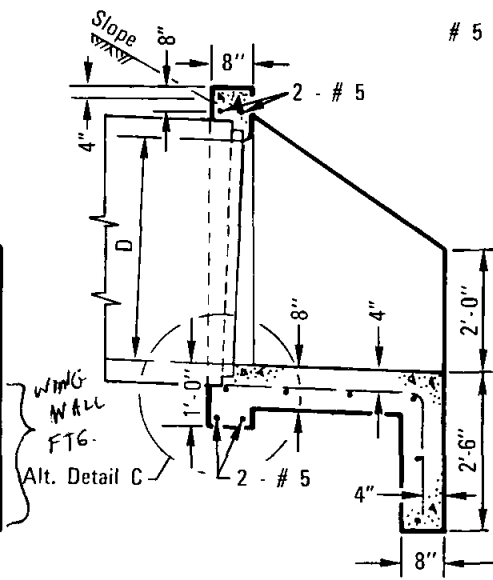
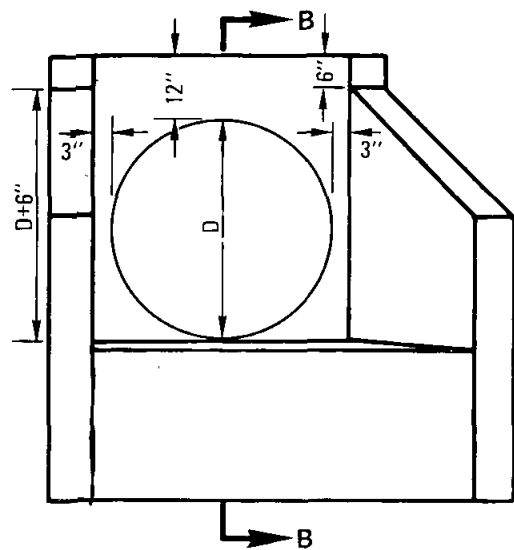
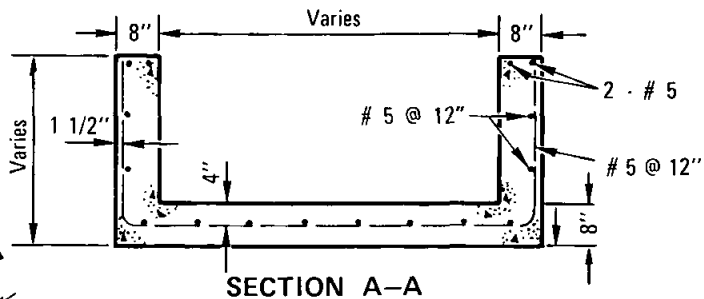
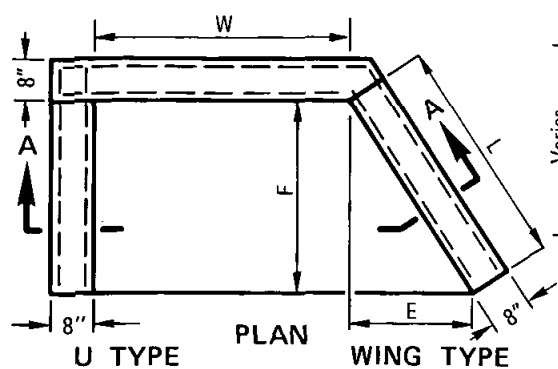
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-34**

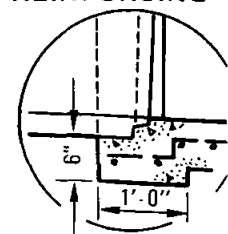
SAN DIEGO REGIONAL STANDARD DRAWING

**WING AND U TYPE HEADWALLS
FOR 12" TO 36" PIPES**

Revision	By	Approved	Date



WING WALL REINFORCING



ALT. DETAIL C

ELEVATION

SECTION B-B

DIA. OF PIPE	DIMENSIONS			SINGLE PIPE				DOUBLE PIPE					
				W	U TYPE		WING TYPE		W	U TYPE		WING TYPE	
	CONC.	STEEL	CONC.		STEEL	CONC.	STEEL	CONC.		STEEL			
											C. Y.	LBS.	C. Y.
42"	3'-7 1/4"	2'-0"	3'-0"	4'-0"	1.57	117	1.90	135	AS SHOWN ON PLANS	2.69	190	3.16	214
48"	4'-6"	2'-6"	3'-9"	4'-6"	1.97	153	2.48	184		3.43	252	4.06	288
54"	5'-4 7/8"	3'-0"	4'-6"	5'-0"	2.41	190	3.07	246		4.24	319	5.06	368
60"	6'-3 3/4"	3'-6"	5'-3"	5'-6"	2.88	239	3.75	294		5.13	386	6.17	442
66"	7'-2 1/2"	4'-0"	6'-0"	6'-0"	3.38	294	4.52	356		6.08	454	7.20	516
72"	8'-1 3/8"	4'-6"	6'-9"	6'-6"	3.93	368	5.52	417		7.11	522	8.30	588
78"	9'-0"	5'-0"	7'-6"	7'-0"	4.50	444	6.70	503		8.20	595	9.50	693
84"	9'-10 3/4"	5'-6"	8'-3"	7'-6"	5.21	540	8.15	619		9.50	687	10.80	786

Note: Dimensions E and L apply to wing type only.

NOTES

1. Skewed Pipes: Dimension W to be increased to take care of increased width or length due to skew of multiple pipes.
2. Tops of headwalls, on grade culverts, shall be placed parallel to profile grade when the grades are 3% or more.
3. Concrete shall be 564-C-3000.
4. Exposed corners shall be chamfered 3/4".
5. Multiple pipes shall be set a distance of D/2, with a 1' minimum, between outside diameters of pipes.
6. For pipe wall thickness greater than 3" use Alternate Detail-C.

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

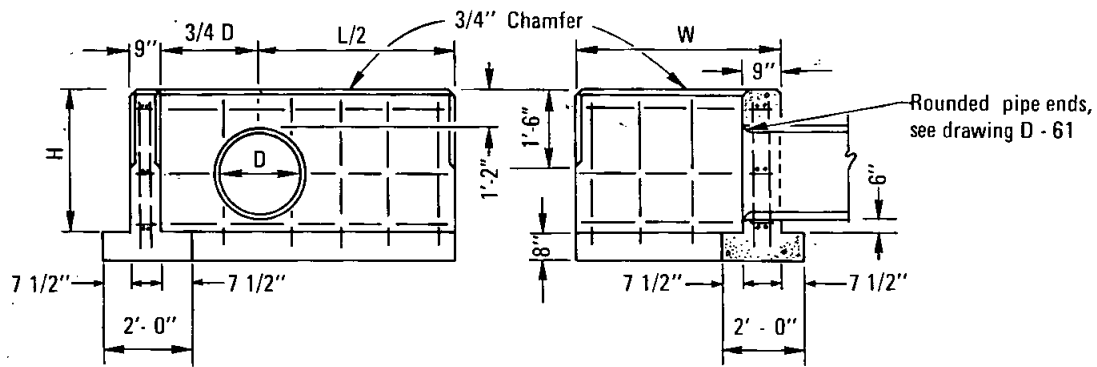
WING AND U TYPE HEADWALLS FOR 42" TO 84" PIPES

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

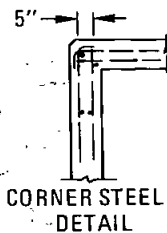
DRAWING
NUMBER

D-35



ELEVATION

SECTION

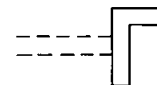


D	H	L/2	LENGTH OF W									
			3' - 4"		4' - 10"		6' - 4"		7' - 10"		9' - 4"	
			Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.
12"	2' - 8"	2' - 6"	50	.79	60	.98						
15"	2' - 11"	3' - 0"	55	.91	65	1.11						
18"	3' - 2"	3' - 6"	65	1.04	75	1.25						
21"	3' - 5"	3' - 9"	75	1.15	90	1.36						
24"	3' - 8"	4' - 3"	85	1.29	100	1.51	110	1.74				
27"	3' - 11"	4' - 9"	90	1.44	105	1.67	115	1.91				
30"	4' - 2"	5' - 0"	95	1.55	110	1.80	120	2.05	135	2.29		
33"	4' - 5"	5' - 6"	105	1.71	120	1.97	135	2.23	150	2.48		
36"	4' - 8"	6' - 0"	110	1.88	125	2.15	140	2.41	155	2.68	170	2.95
39"	4' - 11"	6' - 3"			150	2.28	170	2.56	185	2.84	200	3.12
42"	5' - 2"	6' - 9"			155	2.42	175	2.76	190	3.05	210	3.34
45"	5' - 5"	7' - 3"					180	2.97	200	3.27	215	3.57
48"	5' - 8"	7' - 6"					190	3.13	216	3.44	230	3.75
51"	5' - 11"	8' - 0"							220	3.67	235	3.99
54"	6' - 2"	8' - 6"							235	3.91	250	4.24

NOTES

- Concrete shall be 564 - C - 3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.
- When multiple pipes are used, the distance between pipes shall be D/2 (1' min.). Dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

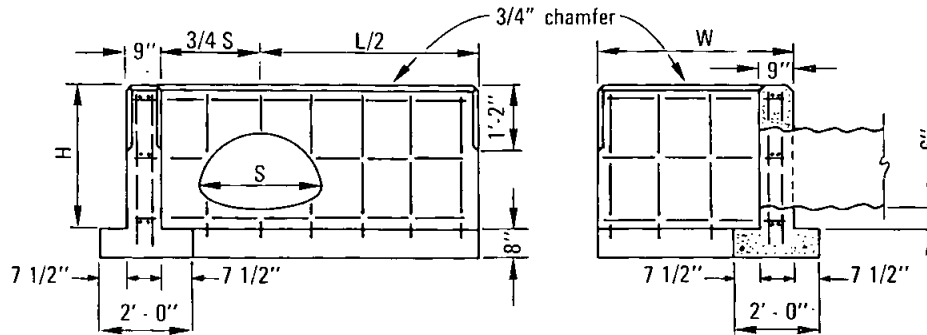
DRAWING
NUMBER

D-36

SAN DIEGO REGIONAL STANDARD DRAWING

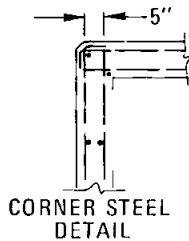
L TYPE HEADWALLS CIRCULAR PIPES

Revision	By	Approved	Date



ELEVATION

SECTION

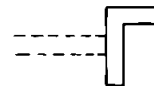


C.S.P. ARCH SIZE	H	L/2	LENGTH OF W									
			3' - 4"		4' - 10"		6' - 4"		7' - 10"		9' - 4"	
			Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.	Steel lbs.	Conc. C. Y.
18"x 11"	2'-7"	2'-9"	50	0.84	60	1.03	70	1.21	80	1.39	90	1.57
21"x 15"	2'-11"	3'-3"	60	1.00	65	1.18	75	1.38	90	1.58	100	1.77
24"x 18"	3'-2"	3'-9"	60	1.07	70	1.32	80	1.53	95	1.74	110	1.94
28"x 20"	3'-4"	4'-3"	70	1.26	80	1.47	90	1.68	100	1.90	115	2.11
35"x 24"	3'-8"	5'-3"	100	1.51	110	1.74	120	1.97	140	2.20	155	2.42
42"x 29"	4'-1"	6'-3"	115	1.82	130	2.06	140	2.31	155	2.55	170	2.83
49"x 33"	4'-5"	7'-3"	130	2.12	145	2.37	155	2.64	170	2.90	185	3.15
57"x 38"	4'-10"	8'-6"	145	2.52	160	2.79	175	3.07	190	3.35	205	3.61
64"x 43"	5'-3"	9'-6"	185	2.89	200	3.11	215	3.48	235	3.77	250	4.06
71"x 47"	5'-7"	10'-6"	200	3.25	215	3.56	235	3.86	250	4.17	270	4.48

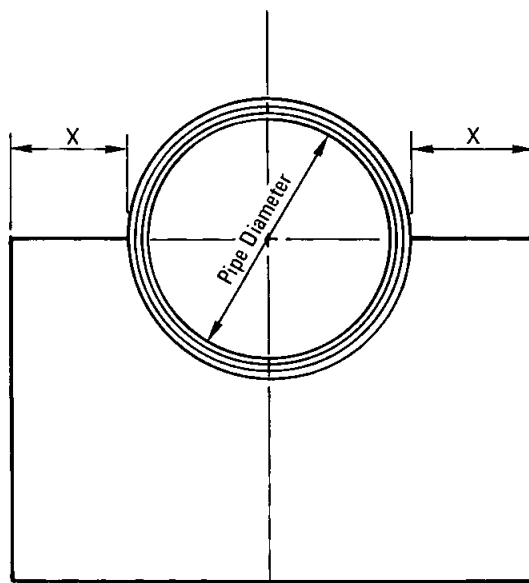
NOTES

- Concrete shall be 564 - C - 3000.
- All reinforcing steel # 4 bars. All vertical and horizontal tie bars 18" maximum spacing.
- When multiple pipes are used, the distance between pipes shall be S/2 (1' min.). The dimension L/2 is from the center of the pipe nearest to the end of the headwall as shown.

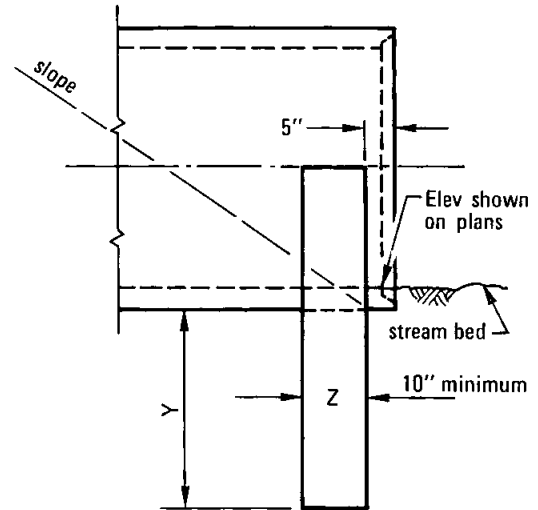
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Elev.	RC	D.S.	7-79		
L TYPE HEADWALLS (C.S.P. ARCH)				DRAWING NUMBER	D-37



FACE ELEVATION



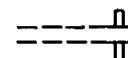
SIDE ELEVATION

PIPE DIAMETER	X	Y	Z
12" to 24"	1' - 0"	2' - 0"	10"
21" to 36"	1' - 6"	2' - 6"	12"
39" to 48"	2' - 0"	3' - 0"	12"
51" to 60"	2' - 6"	3' - 0"	14"
63" & Larger	3' - 0"	3' - 0"	14"

NOTES:

1. A curtain wall shall be used in place of a headwall at culvert ends where extension of the culvert is considered imminent or no fill is retained.
2. Concrete shall be 564-C-3000.
3. Keep the pipe-end clear of obstructions to permit easy placing of culvert extension.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman *Dec. 1975*
Coordinator H.C.E. 19807 Date

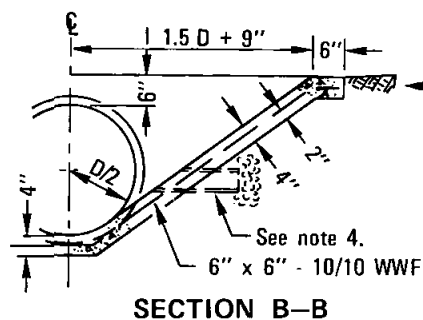
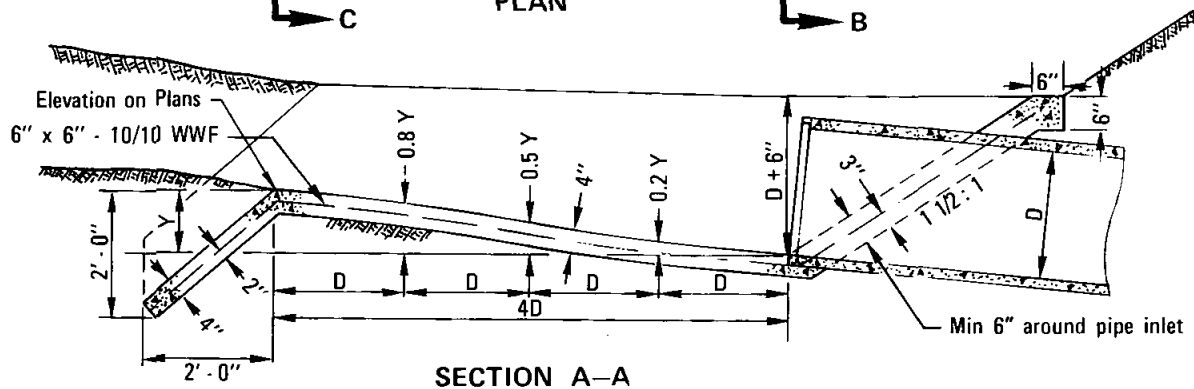
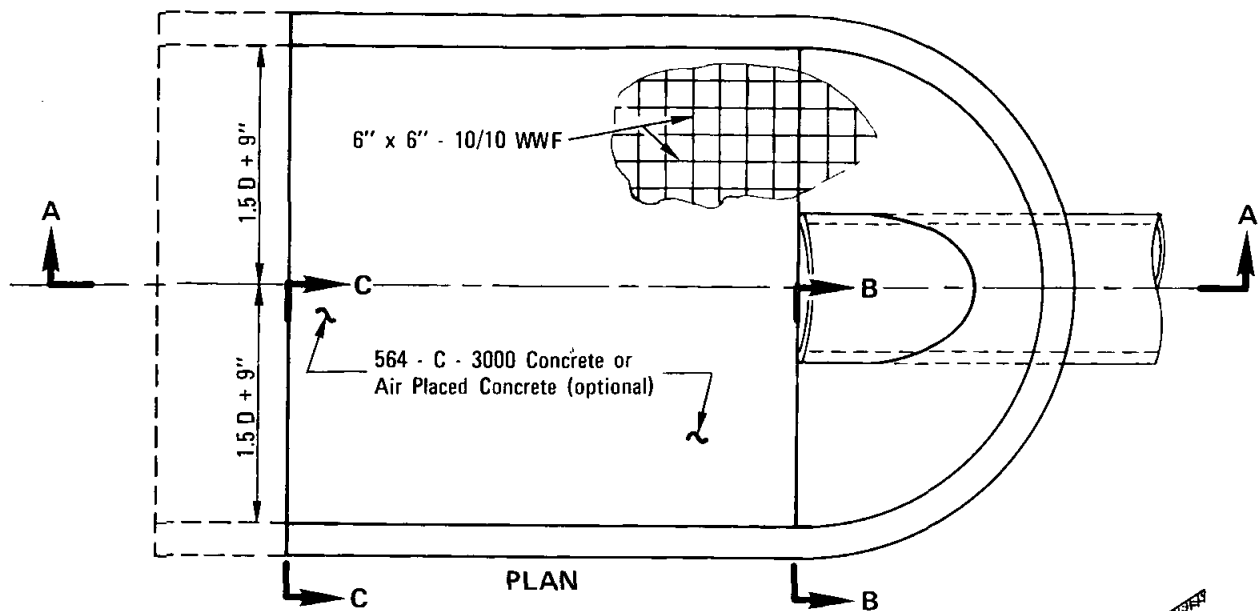
SAN DIEGO REGIONAL STANDARD DRAWING

CURTAIN WALL

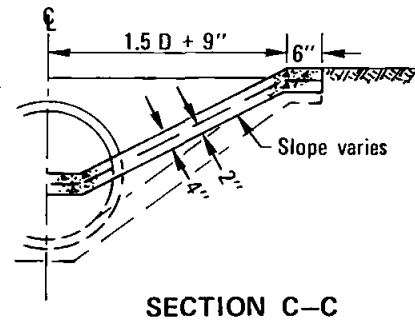
DRAWING
NUMBER

D-38

Revision	By	Approved	Date



Inlet constr.
sym. about Q
except for multiple
pipe installations
(see note 1)



NOTES

1. When more than one pipe is used the profile view shown shall hold for the distance across all pipe openings. Sections A-A and B-B shall be from the outermost pipe. The distance between pipes shall be $D/2$ for round and $\text{Span}/3$ for arch pipe. (12" minimum)
2. Culvert shall be cut off even with apron surface when required by the Agency.
3. Use Inlet Apron only where a flared end section can not be utilized.
4. Place weep holes when required by the Agency.

LEGEND ON PLANS



Revision	By	Approved	Date
Sec. A-A	30	D S	2-79

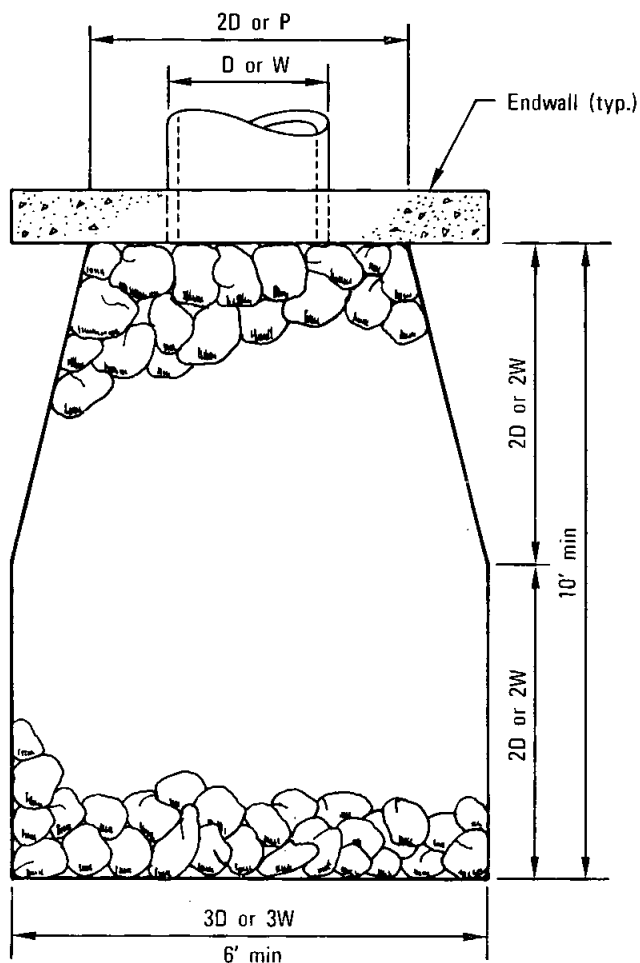
SAN DIEGO REGIONAL STANDARD DRAWING

INLET APRON FOR CULVERTS UP TO 42" DIAMETER

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **D-39**



PLAN

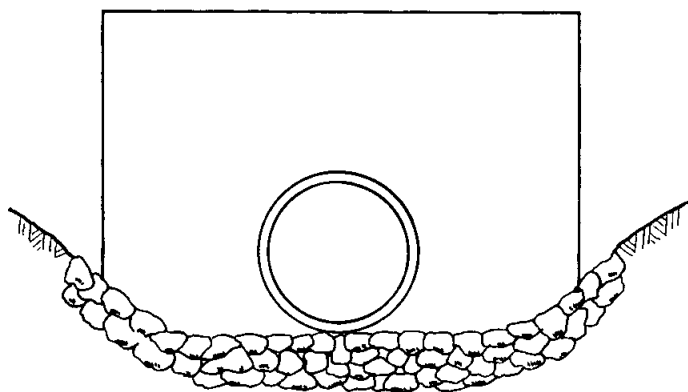
D = Pipe Diameter
W = Bottom Width of Channel
P = Wetted Perimeter of Channel

Design Velocity (ft./sec.)	Rock Classification
6 - 10	No. 2 Backing
10 - 12	1/4 Ton
12 - 14	1/2 Ton
14 - 16	1 Ton
16 - 18	2 Ton

SELECTION OF RIP RAP

NOTES

1. Type of Rip Rap
 - a. Regular Quarry Stone
 - b. Rounded Cobblestone
 - c. Broken Concrete (only allowed upon approval of the Agency)
2. Placement
 - a. Minimum depth = 1 1/2 times average stone size.
 - b. Rocks shall be placed so as to provide a minimum of voids.
 - c. Surface rocks or concrete shall protrude to at least 1/2 their vertical dimension.
 - d. Rip Rap is to be placed over a natural bedding, or it may be grouted or placed over a gravel bedding when required by the Agency.



ELEVATION

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

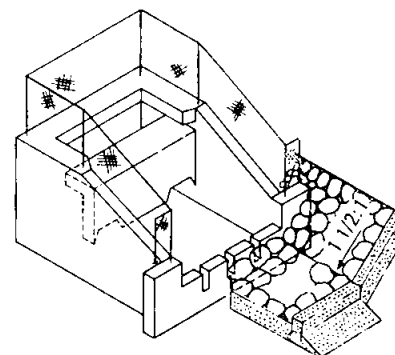
DRAWING
NUMBER

D-40

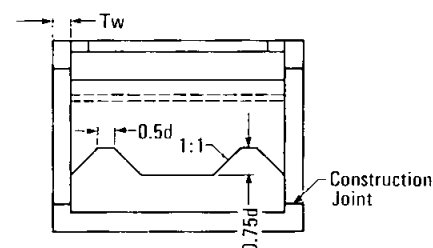
SAN DIEGO REGIONAL STANDARD DRAWING

RIP RAP ENERGY DISSIPATOR

Revision	By	Approved	Date



PICTORIAL VIEW

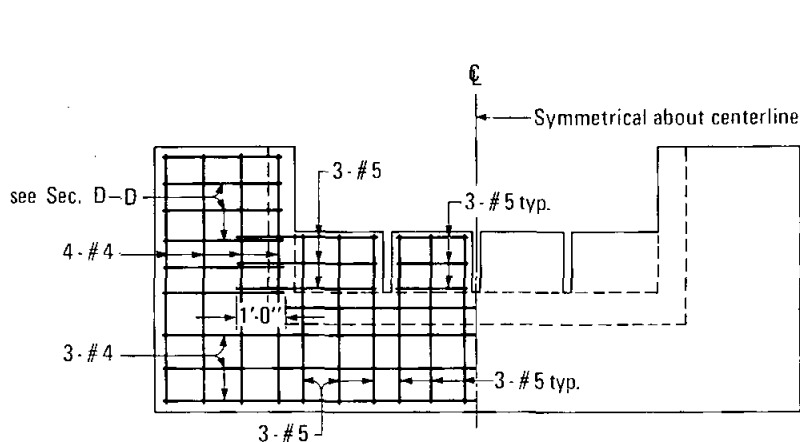


SECTION B-B

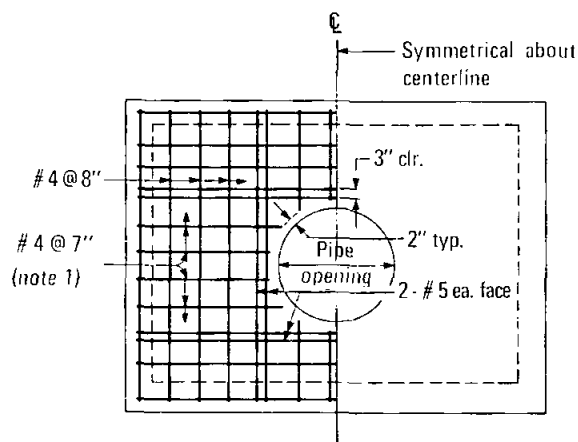
Pipe Dia (in)	18	24	30	36	42	48	54	60	72
Area (sq.ft.)	1.77	3.14	4.91	7.07	9.62	12.57	15.90	19.63	28.27
Max. Q (cfs)	21	38	59	85	115	151	191	236	339
W	5' - 6"	6' - 9"	8' - 0"	9' - 3"	10' - 6"	11' - 9"	13' - 0"	14' - 3"	16' - 6"
H	4' - 3"	5' - 3"	6' - 3"	7' - 3"	8' - 0"	9' - 0"	9' - 9"	10' - 9"	12' - 3"
L	7' - 4"	9' - 0"	10' - 8"	12' - 4"	14' - 0"	15' - 8"	17' - 4"	19' - 0"	22' - 0"
a	3' - 3"	3' - 11"	4' - 7"	5' - 3"	6' - 0"	6' - 9"	7' - 4"	8' - 0"	9' - 3"
b	4' - 1"	5' - 1"	6' - 1"	7' - 1"	8' - 0"	8' - 11"	10' - 0"	11' - 0"	12' - 9"
c	2' - 4"	2' - 10"	3' - 4"	3' - 10"	4' - 5"	4' - 11"	5' - 5"	5' - 11"	6' - 11"
d	0' - 11"	1' - 2"	1' - 4"	1' - 7"	1' - 9"	2' - 0"	2' - 2"	2' - 5"	2' - 9"
e	0' - 6"	0' - 6"	0' - 8"	0' - 8"	0' - 10"	0' - 10"	1' - 0"	1' - 0"	1' - 3"
f	1' - 6"	2' - 0"	2' - 6"	3' - 0"	3' - 0"	3' - 0"	3' - 0"	3' - 0"	3' - 0"
g	2' - 1"	2' - 6"	3' - 0"	3' - 6"	3' - 11"	4' - 5"	4' - 11"	5' - 4"	6' - 2"
Tf	8"			10"		12"			
Tb	7"			9 1/2"		10 1/2"			
Tw	7"			9 1/2"		10 1/2"			
Ta	7"			8"					

Revision	By	Approved	Date
Note 9	SC	DS	7-79

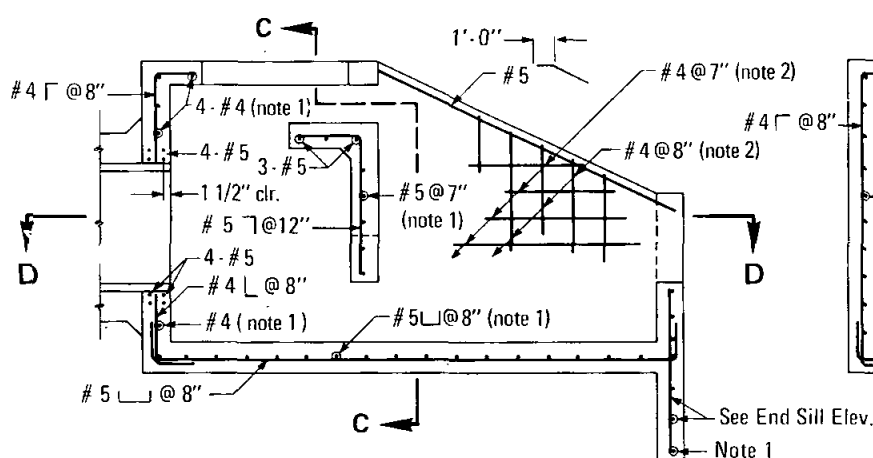
D-41



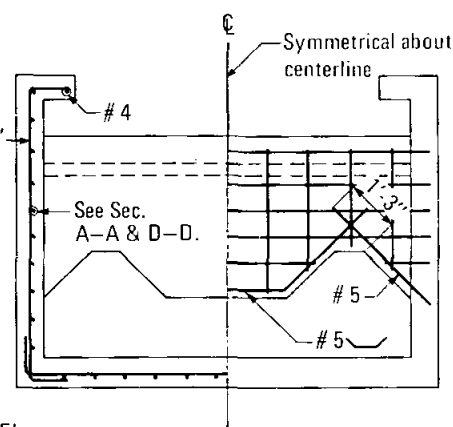
END SILL ELEVATION



HEADWALL ELEVATION



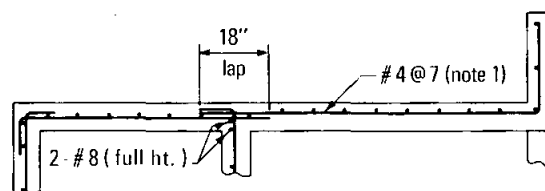
SECTION A-A



SECTION C-C

NOTES

1. Place reinforcing, as noted, at center wall (or slab).
2. Match location of reinforcing with that in headwall, end sill and foundation slab.
3. All reinforcing shall be placed with 2" concrete cover, unless noted otherwise.



SECTION D-D

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum DEC. 1975
Coordinator R.C.E. 19807 Date

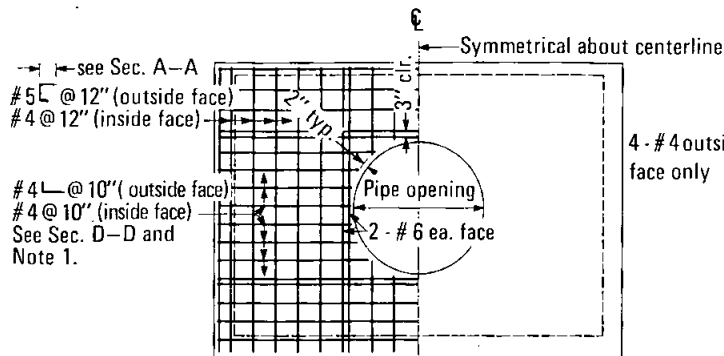
DRAWING
NUMBER

D-42

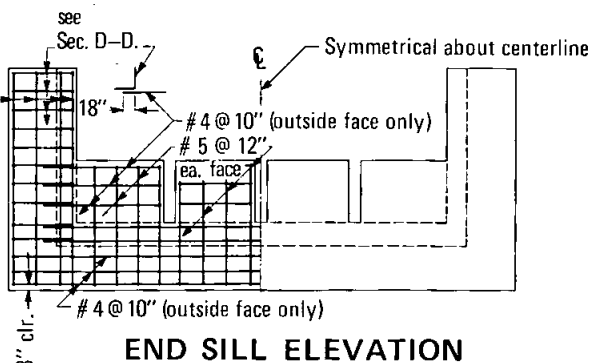
SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE ENERGY DISSIPATOR
(REINFORCEMENT)
18" TO 30" DIAMETER PIPE**

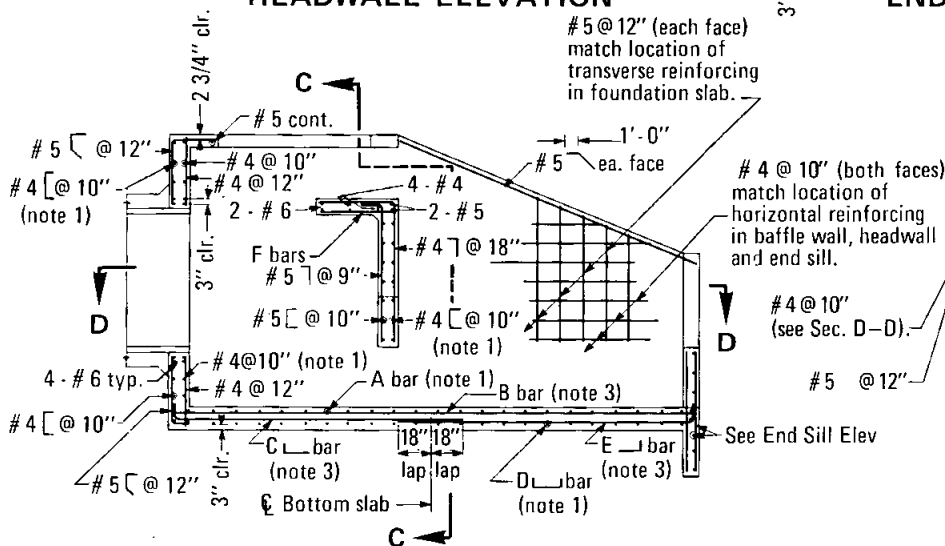
Revision	By	Approved	Date



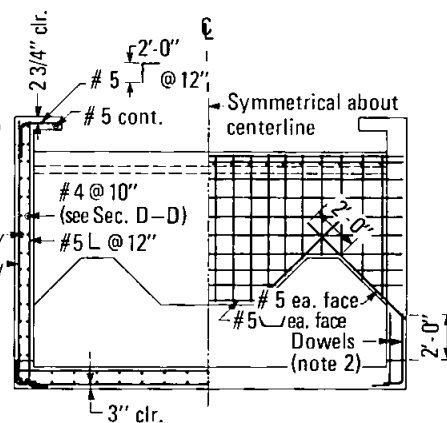
HEADWALL ELEVATION



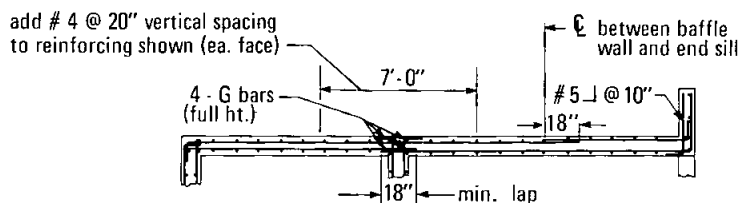
END SILL ELEVATION



SECTION A-A



SECTION C-C



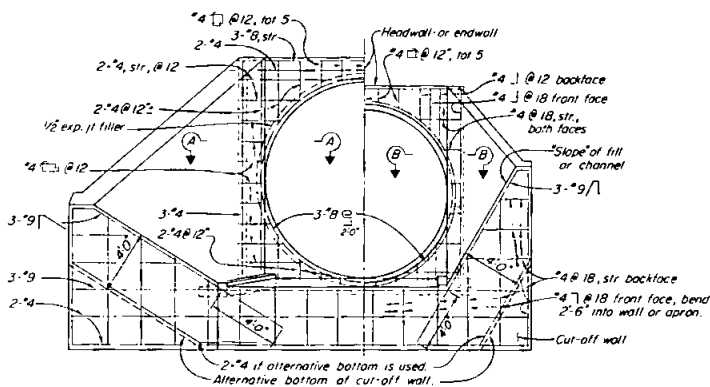
SECTION D-D

NOTES

1. Match location of sidewall reinforcing.
2. Dowels having same size and spacing as wall reinforcing may be used in lieu of continuous bars at contractors option.
3. Match location of headwall or end sill reinforcing.

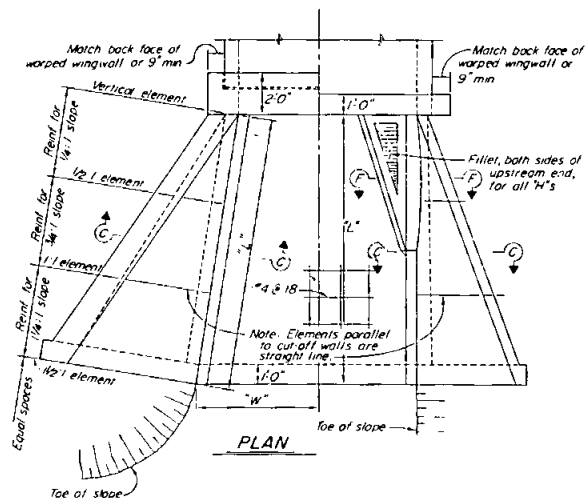
Pipe dia. (in.)	36	42	48	54	60	72
A bar	# 5 @ 12"	# 6 @ 12"	# 7 @ 12"			
B bar	# 5 @ 12"		# 6 @ 12"			
C bar	# 4 @ 12"		# 5 @ 12"			
D bar	# 4 @ 12"	# 5 @ 12"	# 6 @ 12"			
E bar	# 4 @ 12"		# 5 @ 12"			
F bar	# 4 @ 9"	# 5 @ 9"	# 6 @ 9"			
G bar		# 7			# 11	

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE ENERGY DISSIPATOR (REINFORCEMENT)		Allard A. Kuehnal Dec. 1975 Coordinator R.C.E. 19807 Date	
				36" TO 72" DIAMETER PIPE		DRAWING NUMBER	
						D-43	

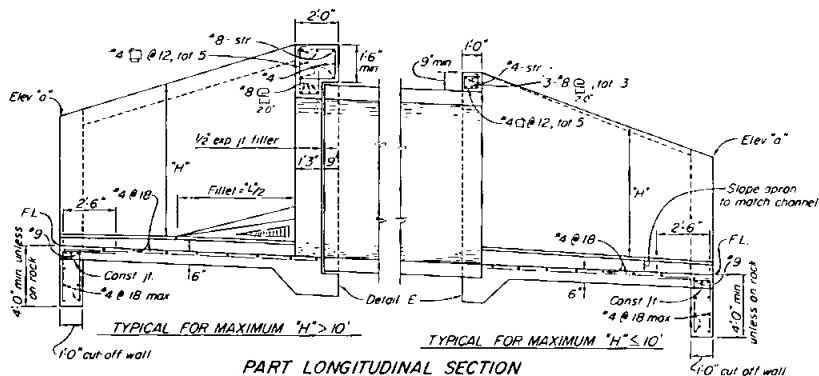


END ELEVATION

If at upstream end, fillet is not shown

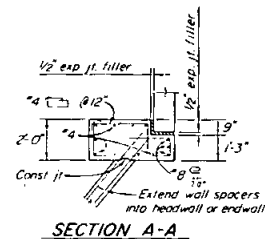


PLAN

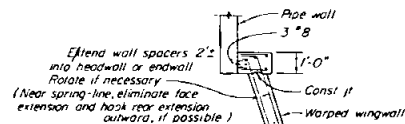


PART LONGITUDINAL SECTION

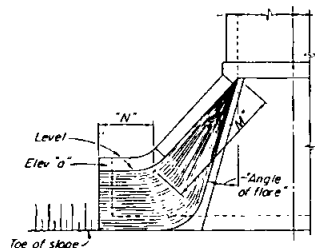
Note: RCP shown. Metal pipe similar except eliminate the expansion joint and use hook bolts @ 19" spacing. Size and length provided by manufacturer.



SECTION A-A

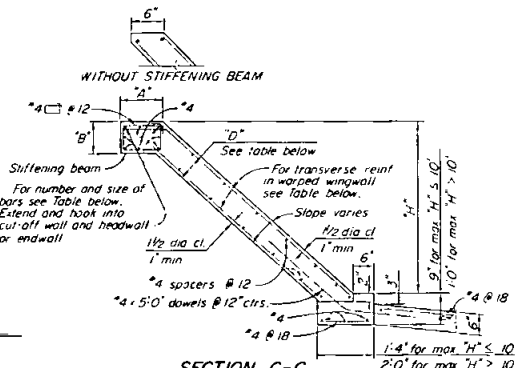


SECTION B-B



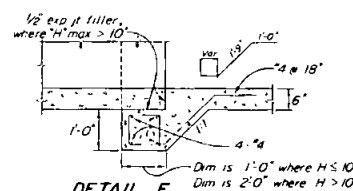
ALTERNATIVE WARPED WINGWALL

Use where additional protection to toe of embankment is required. If at upstream end, fillet is not shown.

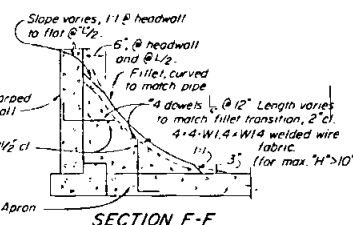


SECTION C-C

Where abrasion is anticipated, increase apron thickness to 7" min to provide 2" min. reinforcement coverage



DETAIL E



SECTION F-F

		WALL DIMENSIONS AND REINFORCING										STIFFENING BEAM DIMENSIONS AND REINFORCING												
Element	Slope	"H"	8' or less	10'	12'	14'	16'	18'	20'	25'	30'	35'	40' or more	"L"	12'	14'	16'	18'	20'	25'	30'	35'	40' or more	
1/4:1	Front face reinf.	#4 @ 12"	#4 @ 7"	#5 @ 7"	#5 @ 5"	#6 @ 6"	#7 @ 7"	#7 @ 5"		No beam. Place 2" @ 6" in each wall along top of wall.														
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"																
3/4:1	Front face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6"	10"	2" @ 9"														
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10"	#4 @ 7"	#4 @ 6"	#4 @ 6"	12"	2" @ 9"														
1 1/4:1	Front face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	14"	Tot 6'-6"														
	Rear face reinf.	#4 @ 8"	#4 @ 8"	#4 @ 5"	#5 @ 6"	#6 @ 7"	#6 @ 6"	#6 @ 6"	16"	Tot 5'-7"														
		"D" at Cut-off Wall	6"	6"	6"	7 1/2"	8"	9 1/2"	11"	18"	Tot 6'-8"													
		"D" at Headwall/Endwall	6"	6"	6"	8"	9 1/2"	11"	1'-1"	20"	Tot 8'-9"													

Notes: Walls designed for 2' surcharge; earth load = 120' cu ft; equivalent fluid pressure = 36' cu ft. Vary "D" at warped wall uniformly from that at cut-off wall to that at headwall or endwall, for max "H" > 12'. Dimensions "L", "W", "H", "M", "N", "Elev. a", "Angle of flare", and end "Slope" (as apply) are shown on the plans.

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

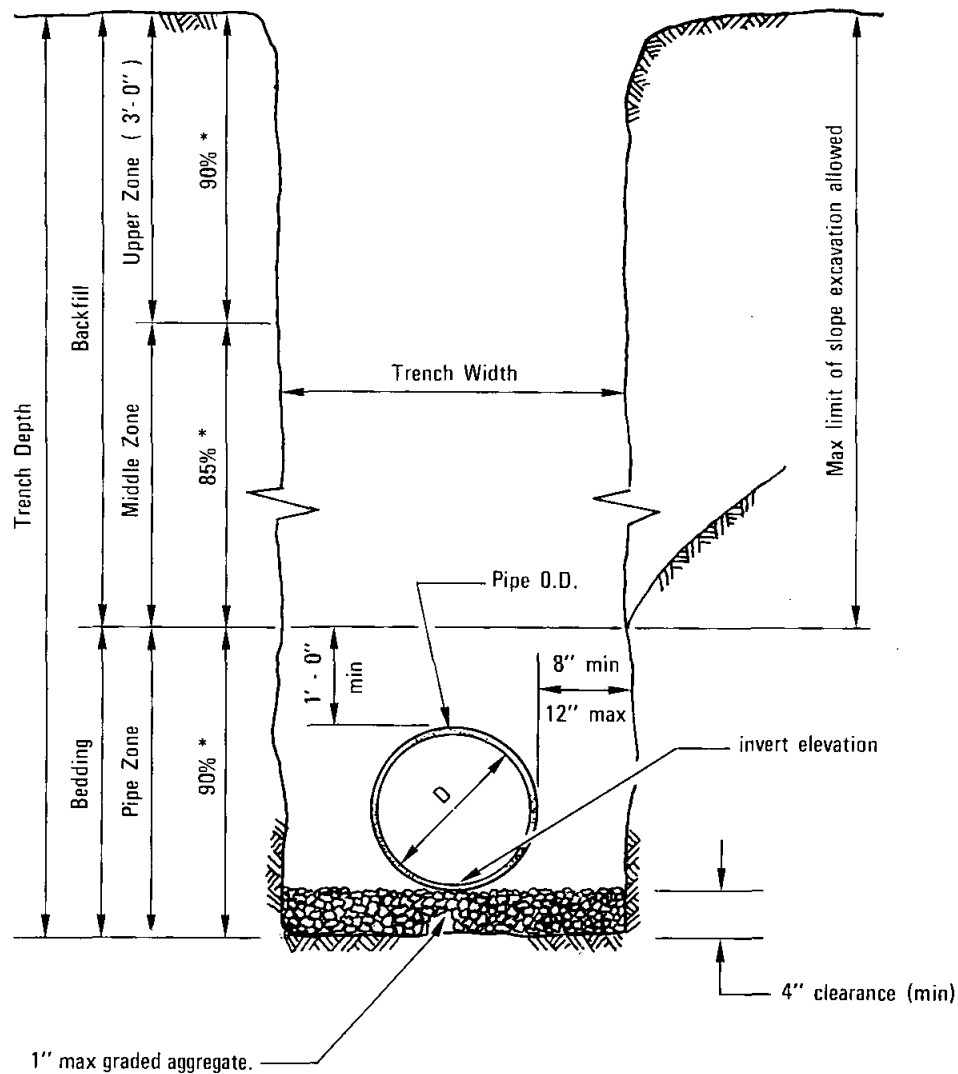
Alan A. Kuehnert Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER D-44

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE CULVERT-HEADWALLS,
ENDWALLS & WARPED WINGWALLS

Revision By Approved Date



SECTION

NOTES

1. For trenching on improved streets see Standard Drawing G - 24 or G - 25 for resurfacing details.
2. (*) indicates minimum relative compaction.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard G. Knechtel *Dec. 1975*
Coordinator R.C.E. 19807 Date

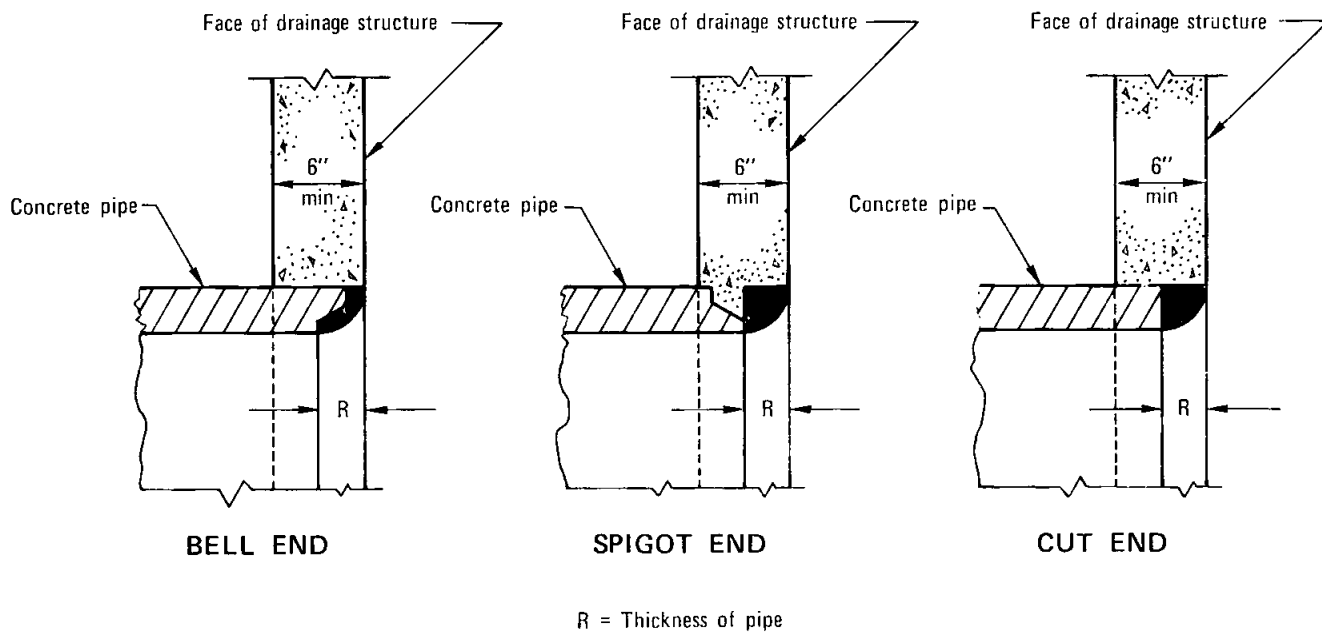
DRAWING
NUMBER

D-60

SAN DIEGO REGIONAL STANDARD DRAWING

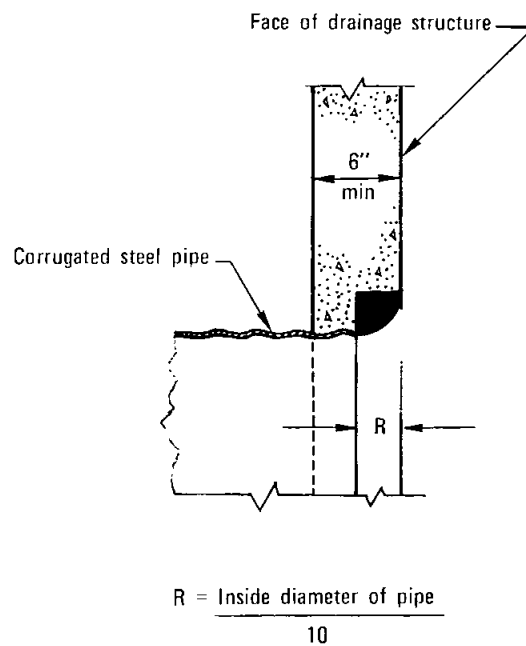
**PIPE BEDDING AND TRENCH BACKFILL
FOR STORM DRAINS**

Revision	By	Approved	Date

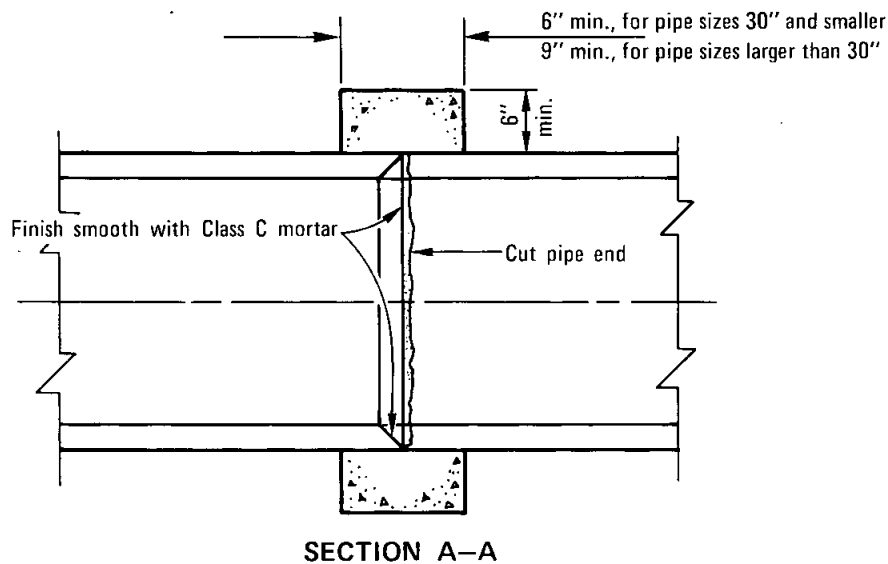
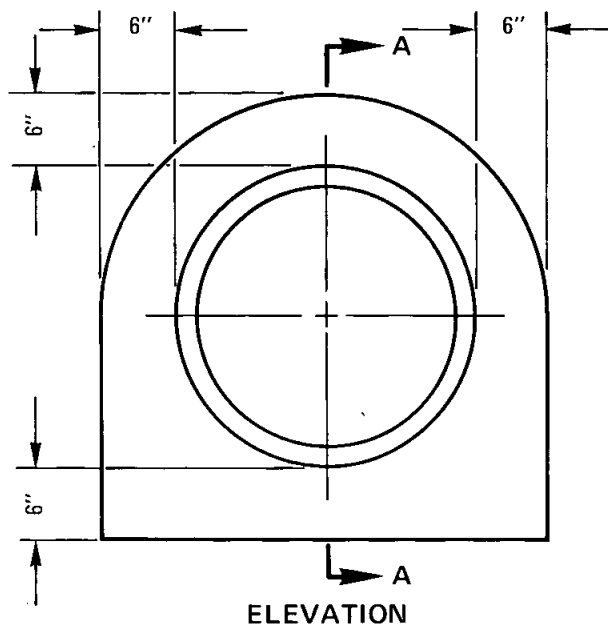


NOTE

The rounded areas may be built up of cement mortar or poured in place with the drainage structure.



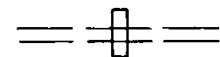
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
Note	Sc	D.S.	7-79			Allen A. Kuehn	Dec. 1975
				ROUNDED PIPE ENDS IN DRAINAGE STRUCTURES		Coordinator R.C.E. 1980/	Date
						DRAWING NUMBER	D-61



NOTES:

1. Pipe collar does not have to be finished if covered, but must have a minimum of 6" of concrete around joint.
2. Concrete shall be 564 - C - 3000

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard G. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

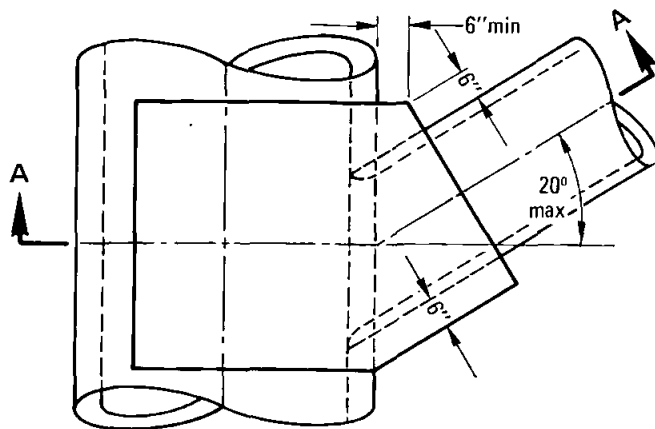
DRAWING
NUMBER

D-62

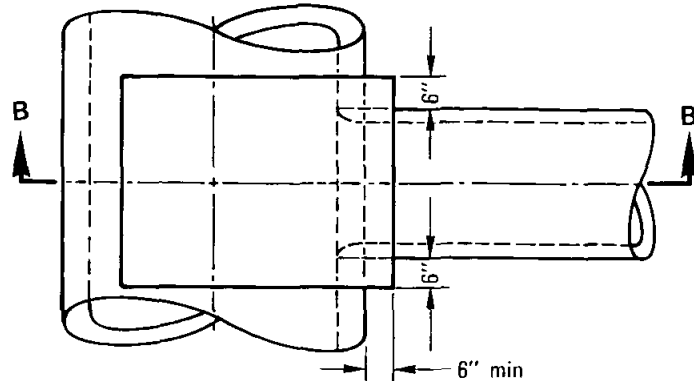
SAN DIEGO REGIONAL STANDARD DRAWING

PIPE COLLAR

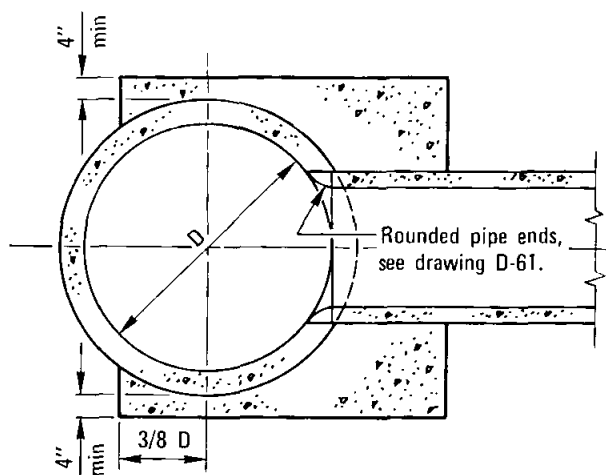
Revision	By	Approved	Date



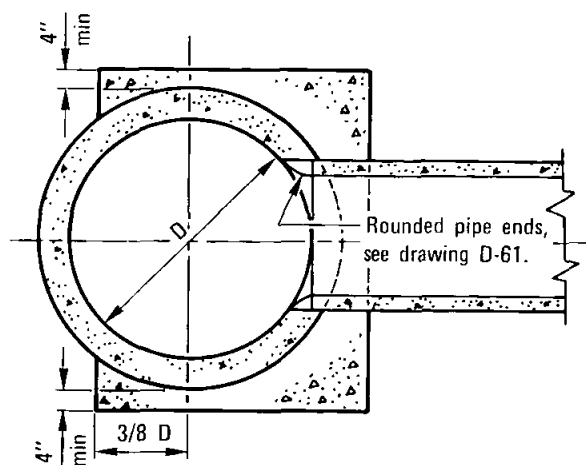
PLAN
SKEWED CONNECTION



PLAN



SECTION A-A



SECTION B-B

NOTES

1. The end of connecting pipe shall not project into the waterway of the larger pipe.
2. The larger pipe shall not be less than 24" I.D.
3. The smaller pipe shall not be more than 2/3 the size of the larger pipe.
4. Concrete shall be 470 - C - 2000.

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

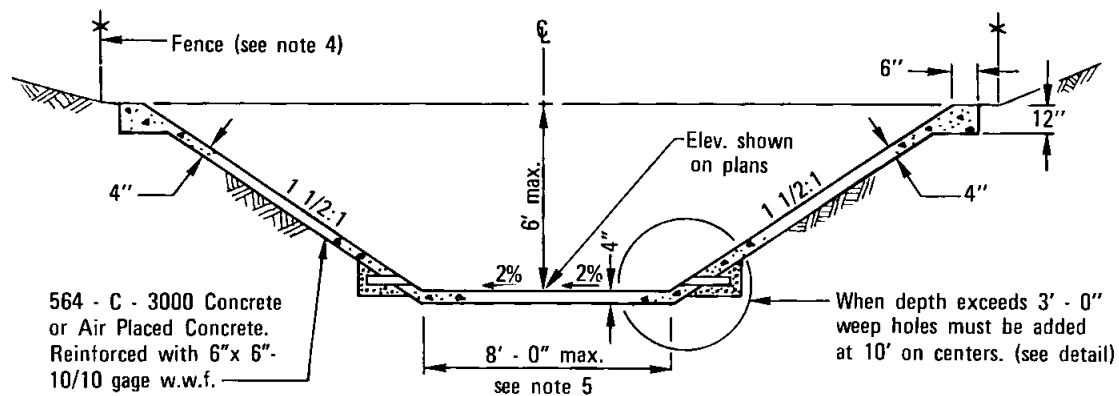
CONCRETE LUG

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

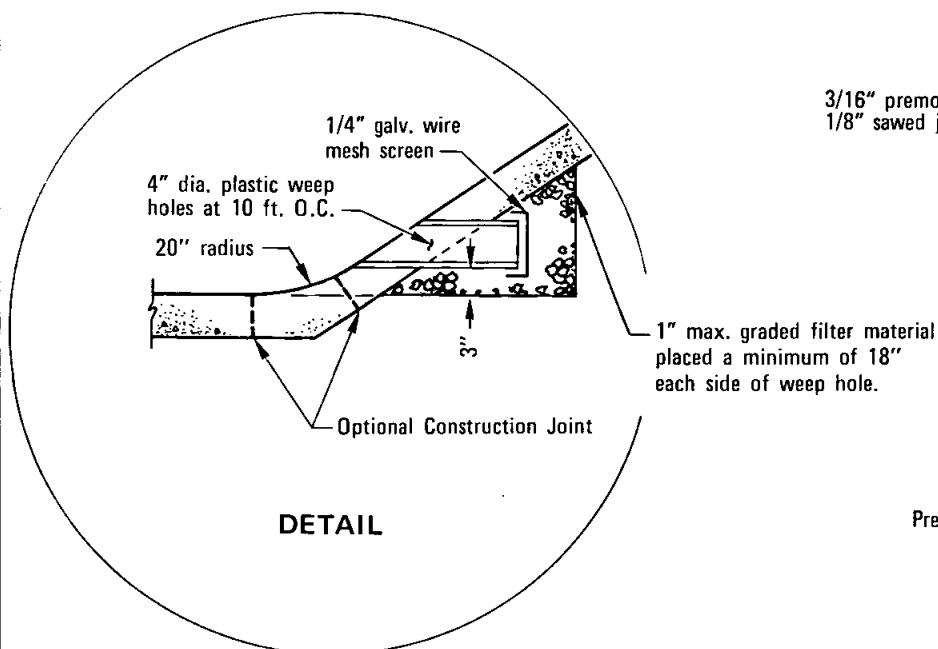
Oliver A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

D-63

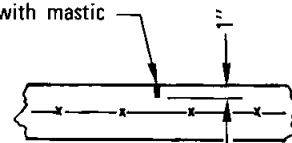


TYPICAL SECTION

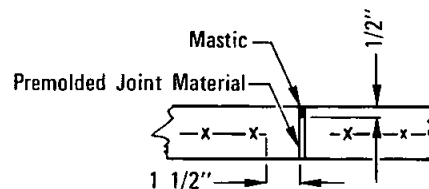


DETAIL

3/16" premolded joint material or 1/8" sawed joint filled with mastic



WEAKENED PLANE JOINT

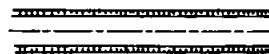


EXPANSION JOINT

NOTES

1. A.C. or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 12' to 15'. Expansion joints shall be placed at all changes of section and at ends of curves.
3. Cutoff walls shall be constructed at each end of the channel along the full width of section. See Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. For bottom widths greater than 8 feet see Standard Drawing D-71.
6. Reinforcement shown is minimum.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

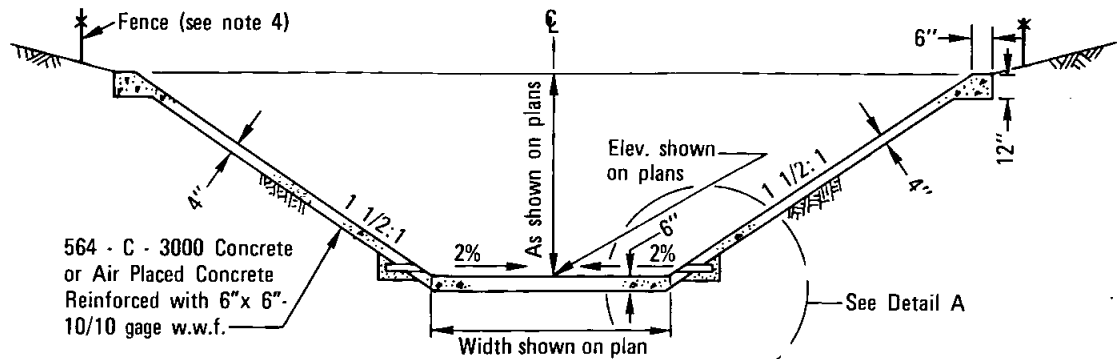
SAN DIEGO REGIONAL STANDARD DRAWING

MINOR DRAINAGE CHANNEL

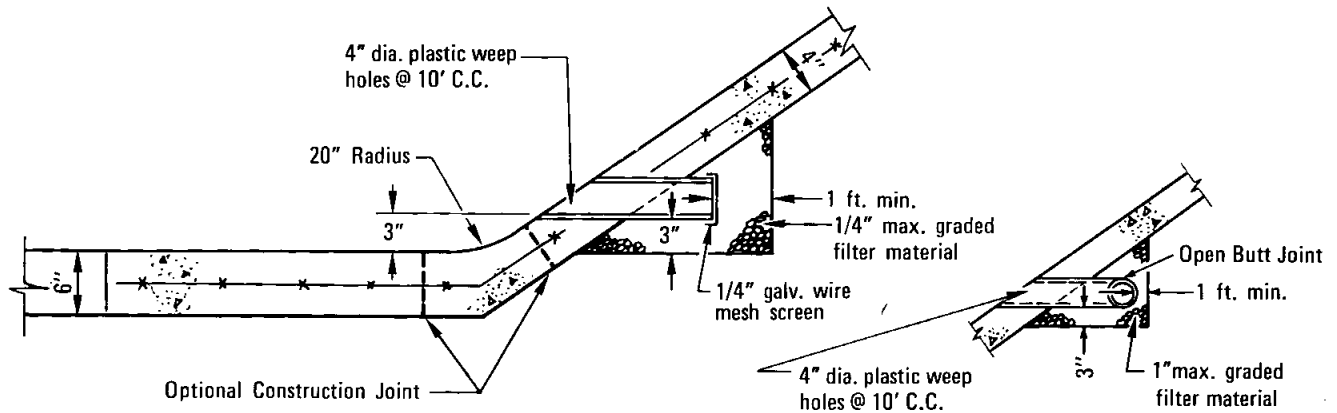
**DRAWING
NUMBER**

D-70

Revision	By	Approved	Date



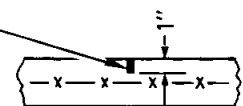
TYPICAL SECTION



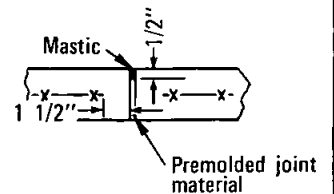
DETAIL A

ALT. CONTINUOUS DRAIN

3/16" premolded joint material or
1/8" sawed joint with mastic



WEAKENED PLANE JOINT



EXPANSION JOINT

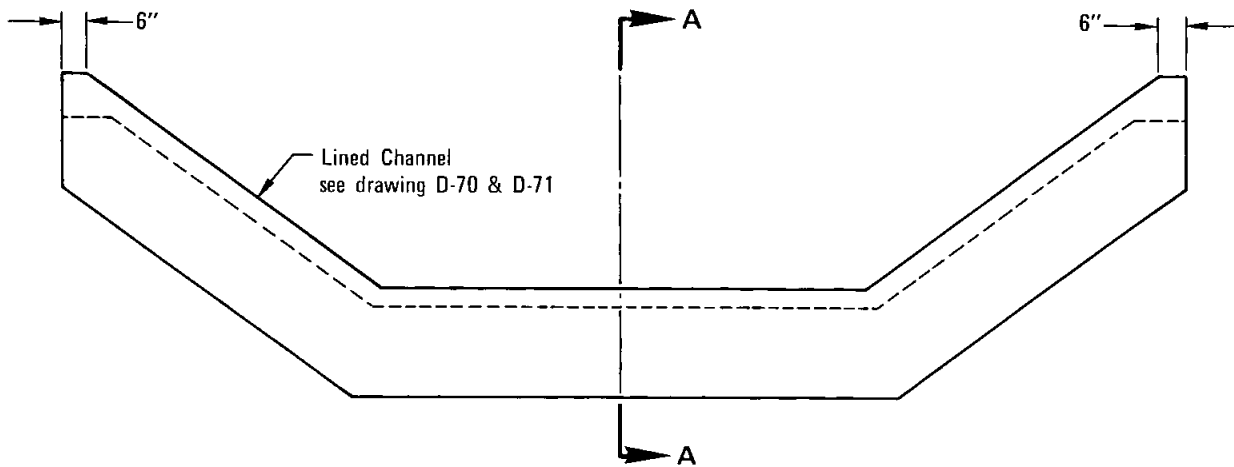
NOTES

1. A.C. or clay pipe may be substituted for plastic pipe at weep holes.
2. Weakened plane joints shall be placed every 12' to 15'. Expansion joints shall be placed at all changes of section and at ends of curves.
3. Cutoff walls shall be constructed at each end of the channel along the full width of section. See Standard Drawing D-72.
4. Chainlink fence shall be as required by Agency.
5. Reinforcement shown is minimum.

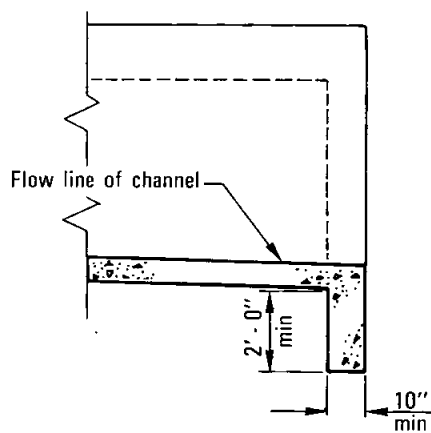
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				MAJOR DRAINAGE CHANNEL		<i>Allan A. Kuehn</i> Dec. 1975
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER D-71



ELEVATION

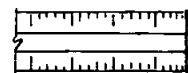


SECTION A-A

NOTES

1. Thickness and wall depth shall be as shown on plan.
2. Reinforcing in cutoff wall shall be the same as that required in channel.
3. Concrete shall be 564-C-3000.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

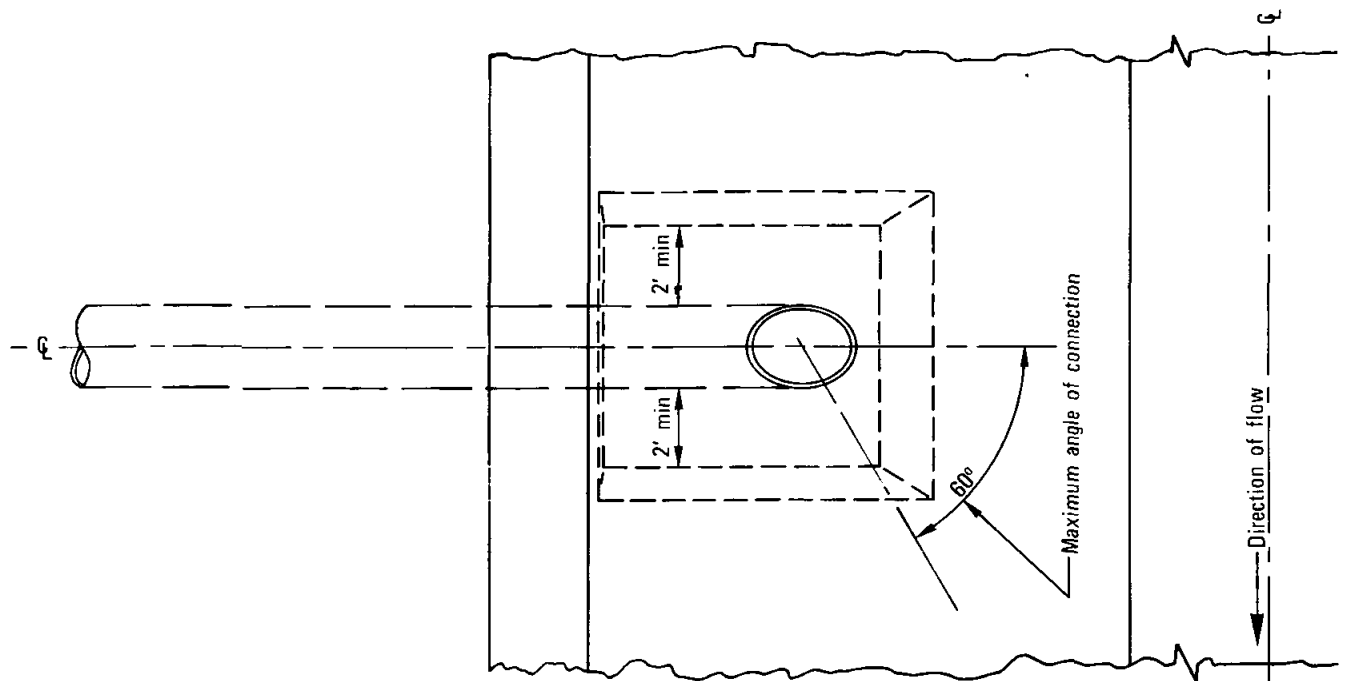
SAN DIEGO REGIONAL STANDARD DRAWING

CUTOFF WALL FOR DRAINAGE CHANNEL

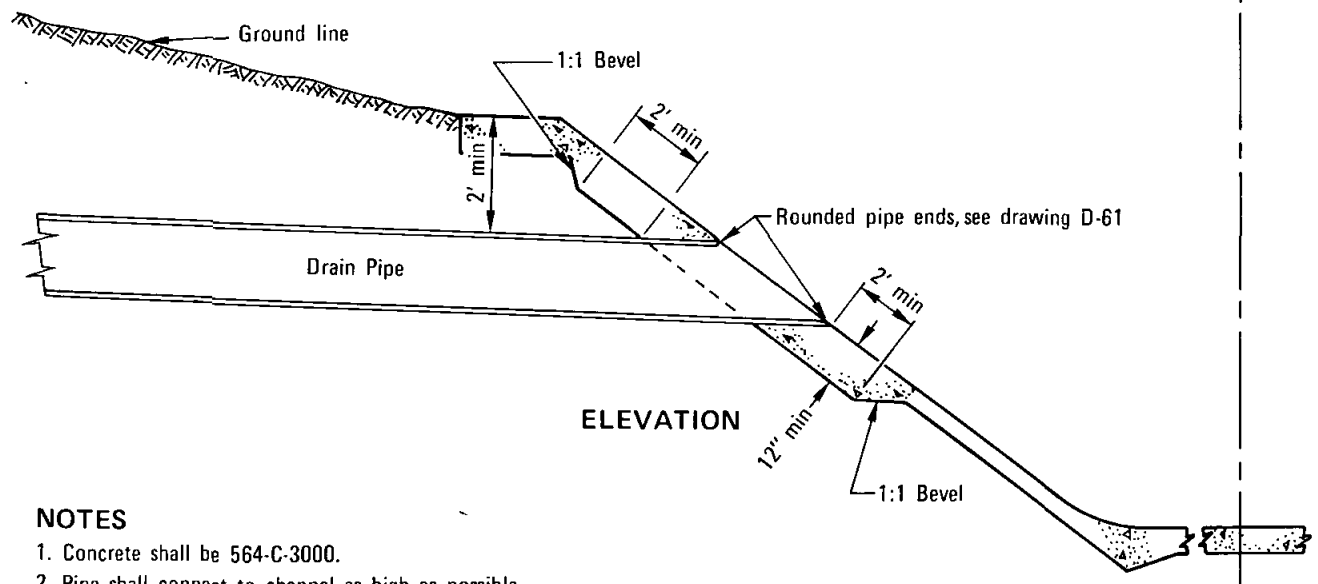
DRAWING
NUMBER

D-72

Revision	By	Approved	Date



PLAN

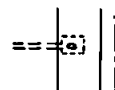


ELEVATION

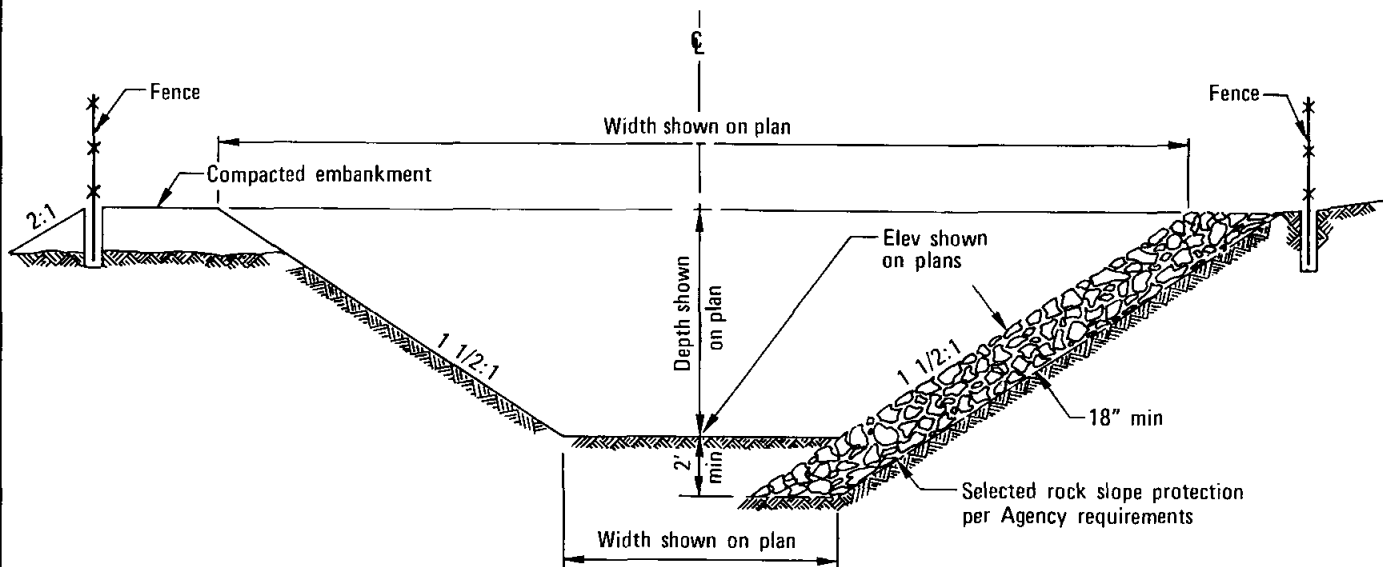
NOTES

1. Concrete shall be 564-C-3000.
2. Pipe shall connect to channel as high as possible.
3. The maximum angle of connection is 60° downstream.
In no case shall a pipe angle upstream.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
						<i>Allard G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
				PIPE TO CHANNEL CONNECTION		DRAWING NUMBER D-73



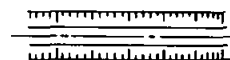
TYPICAL SECTION

NOTE

The following shall be as required by Agency:

- a) Low flow channel
- b) Filter blanket
- c) Cutoff wall
- d) Fence

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

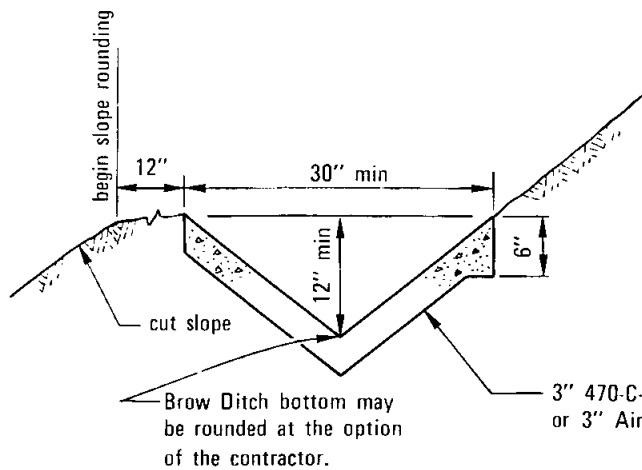
DRAWING
NUMBER

D-74

SAN DIEGO REGIONAL STANDARD DRAWING

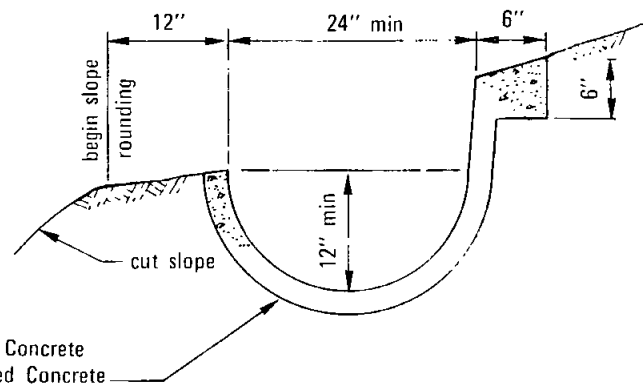
GRADED EARTH CHANNEL

Revision	By	Approved	Date

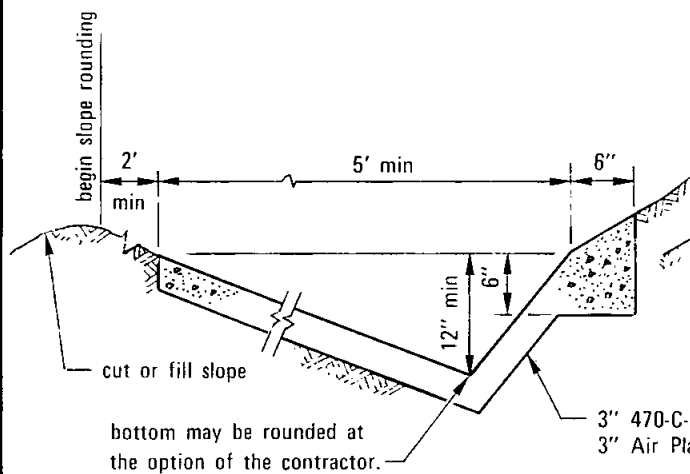


TYPE A

BROW DITCH

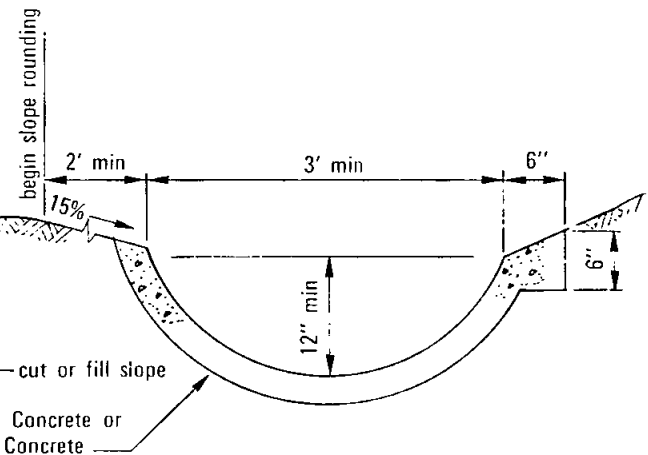


TYPE B



TYPE C

TERRACE DITCH

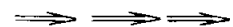


TYPE D

NOTES

1. Longitudinal slope of lined ditch shall be 2% minimum.
2. Reinforcing, when required by Agency, shall be 1 1/2" x 1 1/2" 17 gage stucco netting.
3. Over slope down ditches shall employ 6" thickened edge section at both sides of ditch.

LEGEND ON PLANS



Revision	By	Approved	Date
Ditch type	SC	D.S.	7-79

SAN DIEGO REGIONAL STANDARD DRAWING

DRAINAGE DITCHES

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn *DEC. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

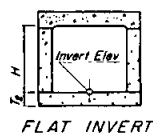
D-75

[illegible]

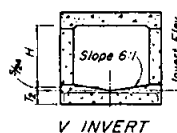
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities.

SPAN HEIGHT		7'												8'												10'												12'																																	
		3'			4'			5'			6'			7'			3'			4'			5'			6'			7'			8'			4'			5'			6'			7'			8'			9'			10'			6'			7'			8'			9'			10'			12'
CONC.	STRENGTH CLASSIFICATION																																																																						
	MAX. FILL OVER TOP																																																																						
CONC.	Top Slab																																																																						
	Bottom Slab																																																																						
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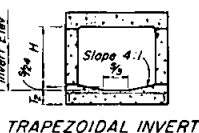
Ⓢ For reinforcement clearance, except at bottom, see "Miscellaneous Details."



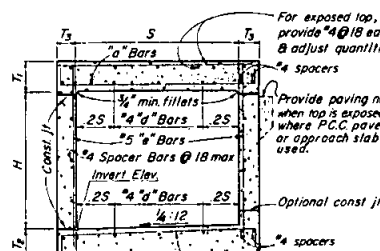
FLAT INVERT



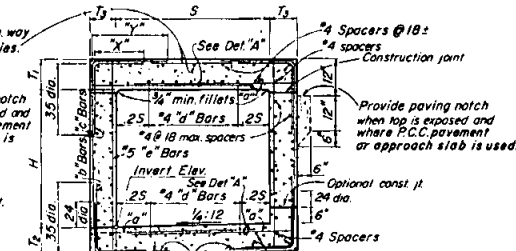
ALTERNATIVE INVERTS
(When shown)



TRAPEZOIDAL INVERT



TYPICAL SECTIONS 2' THRU 6' SPANS



2" Cl. (1) 1" c. Bars 4 Spacers @ 18"
TYPICAL SECTION 7' THRU 12' SPANS



DETAIL "A"

DOUBLE BOX CULVERT

SAN DIEGO REGIONAL STANDARD DRAWING

DRAWING NUMBER D-77

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
 Date: 11/19/1975
 Coordinator: R.C.E. 19807

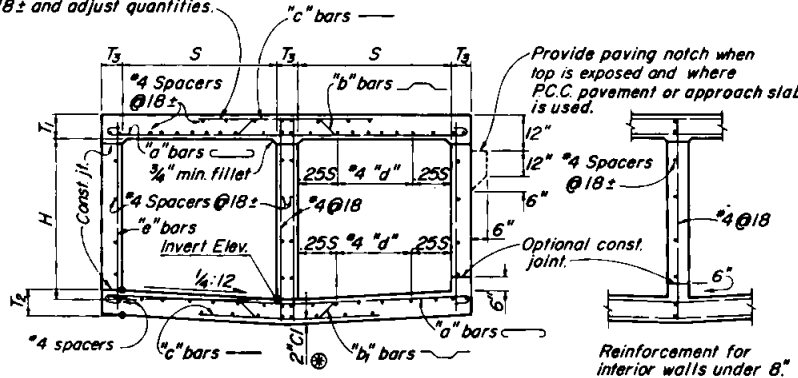
Revision By Approved Date

SPAN		4'				5'				6'				8'			
HEIGHT		2'		3'		4'		5'		6'		7'		8'		9'	
STRENGTH CLASSIFICATION		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
MAX. FILL OVER TOP		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Conc.	Top Slab	6 1/2	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2
	Bottom Slab	6 1/2	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2	7 1/4	6 1/2
Reinforcing Steel	Size: Bar	5	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	11	11	9	11	10 1/2	8 1/2	7 1/2	10 1/2	8 1/2	7 1/2	10 1/2	8 1/2	7 1/2	10 1/2	8 1/2	7 1/2
Concrete	Top Slab-Tot. No.	10	6	6	10	6	6	10	6	6	10	6	6	10	6	6	10
	Bottom Slab-Tot. No.	10	6	6	10	6	6	10	6	6	10	6	6	10	6	6	10
Spacers	Size: Bar	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Concrete: CY per lin ft		0.470	0.51	0.53	0.55	0.56	0.57	0.58	0.59	0.60	0.61	0.62	0.63	0.64	0.65	0.66	0.67
Reinft: Lbs per lin ft		81	74	84	84	79	91	101	87	83	99	111	99	100	109	103	104

SPAN		10'				12'				14'				16'			
HEIGHT		5'		6'		7'		8'		9'		10'		11'		12'	
STRENGTH CLASSIFICATION		A	B	C	D	A	B	C	D	A	B	C	D	A	B	C	D
MAX. FILL OVER TOP		2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Conc.	Top Slab	8 1/2	12 1/2	16	10 1/2	14 1/2	18 1/2	22 1/2	16 1/2	20 1/2	24 1/2	28 1/2	22 1/2	26 1/2	30 1/2	34 1/2	28 1/2
	Bottom Slab	8 1/2	12 1/2	16	10 1/2	14 1/2	18 1/2	22 1/2	16 1/2	20 1/2	24 1/2	28 1/2	22 1/2	26 1/2	30 1/2	34 1/2	28 1/2
Reinforcing Steel	Size: Bar	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	11	10	10	11	9 1/2	10	11	10	9	11 1/2	9	11 1/2	9	11 1/2	9	11 1/2
Concrete	Top Slab-Tot. No.	22	12	12	22	12	12	22	12	12	22	12	12	22	12	12	22
	Bottom Slab-Tot. No.	22	12	12	22	12	12	22	12	12	22	12	12	22	12	12	22
Spacers	Size: Bar	6	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	Spacing	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
Concrete: CY per lin ft		1.02	0.52	0.46	1.43	0.67	0.48	1.21	0.64	0.68	2.72	0.74	0.84	1.92	0.53	0.41	1.04
Reinft: Lbs per lin ft		236	254	310	238	274	324	243	280	339	252	278	355	430	279	327	404

Note:
 For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for both cells.

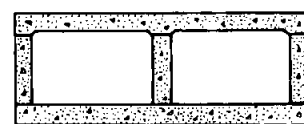
For exposed top, extend "c" bars full length, top slab only, provide additional "4" spacers @18" and adjust quantities.



TYPICAL SECTION

(Showing reinforcement for interior walls 8" and over.)

For reinforcement clearance, except at bottom, see "Miscellaneous Details."



"FLAT INVERT" ALTERNATIVE

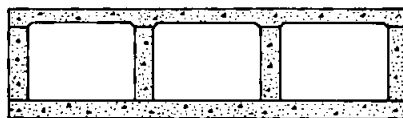
(When shown)

[illegible]

SPAN		5'				6'				7'				8'				10'				6'				7'				8'				9'				10'				12'			
HEIGHT		A		B		C		A		B		C		A		B		C		A		B		C		A		B		C		A		B		C									
STRENGTH CLASSIFICATION		2		1		20		2		1		20		2		1		20		2		1		20		2		1		20		2		1		20									
MAX. FILL OVER TOP		2		1		20		2		1		20		2		1		20		2		1		20		2		1		20		2		1		20									
Conc	Top Slab	1		10		12		9		10		12		9		10		12		9		10		12		9		10		12		9		10		12									
	Bottom Slab	1		10		12		9		10		12		9		10		12		9		10		12		9		10		12		9		10		12									
	Sidewalls	1		10		12		9		10		12		9		10		12		9		10		12		9		10		12		9		10		12									
Steel	a	Size: Bar *		5		6		6		6		6		6		6		6		6		6		6		6		6		6		6		6		6									
	Spacing	10		13		10		10		13		10		10		13		10		10		13		10		10		13		10		10		13		10									
	Length	36		32		32		32		32		32		32		32		32		32		32		32		32		32		32		32		32		32									
	b	Size: Bar *		6		7		7		6		7		7		6		7		7		6		7		7		6		7		7		6		7									
	Spacing	10		13		10		10		13		10		10		13		10		10		13		10		10		13		10		10		13		10									
	c	Size: Bar *		6		7		7		6		7		7		6		7		7		6		7		7		6		7		7		6		7									
	Spacing	10		13		10		10		13		10		10		13		10		10		13		10		10		13		10		10		13		10									
	d	Size: Bar *		6		7		7		6		7		7		6		7		7		6		7		7		6		7		7		6		7									
	Spacing	10		13		10		10		13		10		10		13		10		10		13		10		10		13		10		10		13		10									
	Length	21		21		21		21		21		21		21		21		21		21		21		21		21		21		21		21		21		21									
Reinforcing Steel	d Dist. Top Slab-Tot. No.	24		15		15		27		15		15		27		15		15		27		15		15		27		15		15		27		15		15									
	Bottom Slab-Tot. No.	15		15		15		15		15		15		15		15		15		15		15		15		15		15		15		15		15		15									
	Size: Bar *	6		6		6		6		6		6		6		6		6		6		6		6		6		6		6		6		6		6									
	Bars Spacing	18		13		10		18		13		10		18		13		10		18		13		10		18		13		10		18		13		10									
Spacers Number		68		68		68		72		76		94		102		76		80		84		90		104		114		126		144		168		192											
Concrete C.Y. per lin ft.		158		240		282		206		248		290		212		255		293		234		277		323		258		301		242		285		328		269									
Reinlt. Lbs. per lin ft.		339		372		470		333		394		492		367		391		508		377		402		514		380		404		516		387		411		523									

Note:
For boxes of height less than that shown in table, use next greater table height slabs, wall dimensions and reinforcing steel, and make necessary changes in bar lengths, number of spacers and quantities. Number of "d" bars in table is slab total for all three cells

* For reinforcement clearance, except at bottom, see "Miscellaneous Details"

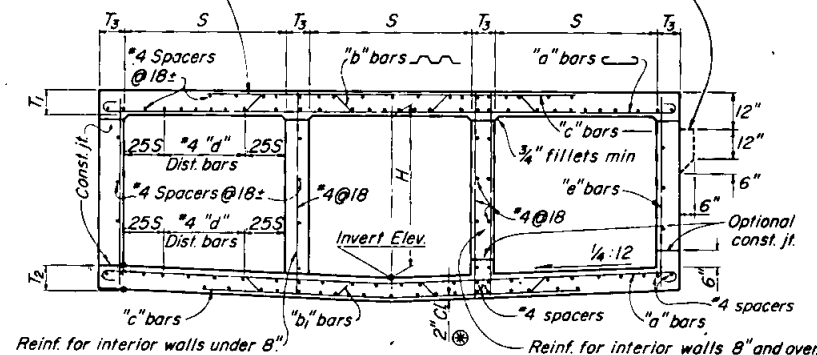


"FLAT INVERT" ALTERNATIVE
(When shown)

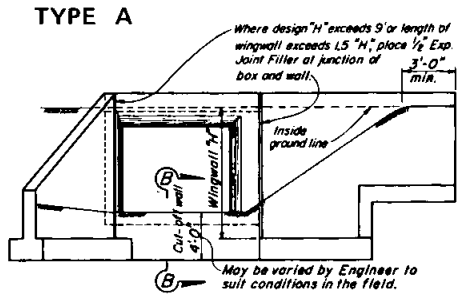
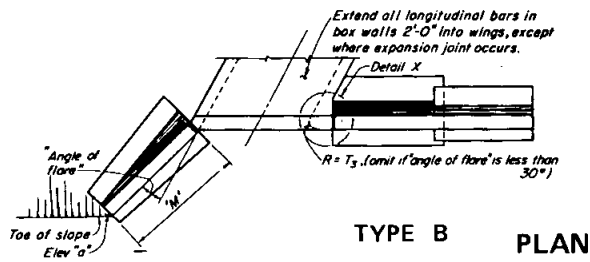


For exposed top, extend
"c" bars full length, provide
additional #4 spacers @ 18" and
adjust quantities.

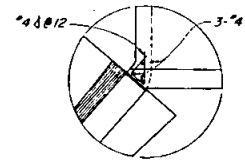
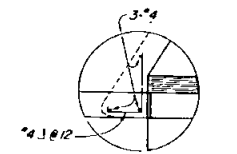
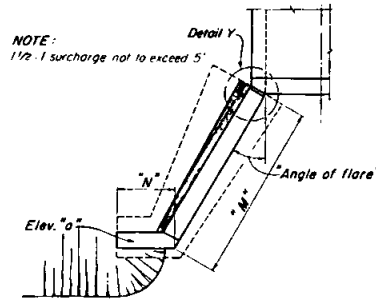
Provide paving notch when top is exposed and where P.C.C. pavement or approach slab is used.



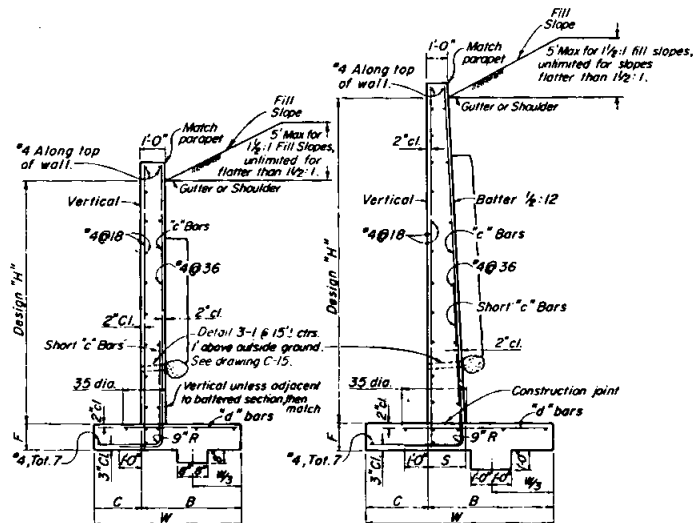
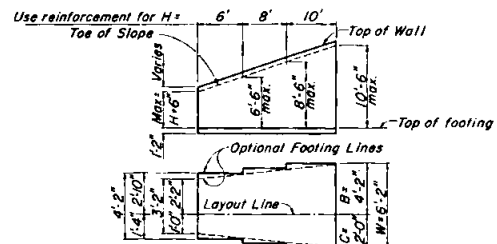
TYPICAL SECTION



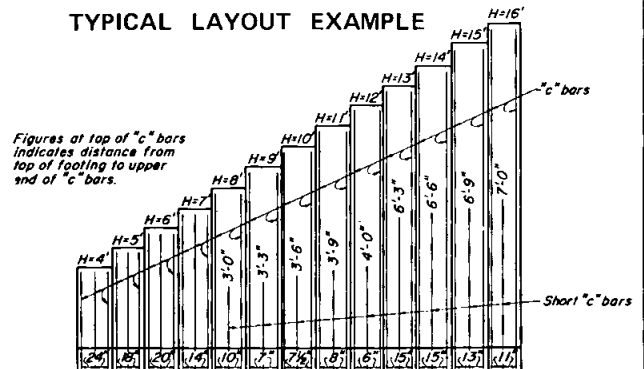
TYPE A TYPE B
END ELEVATION
STRAIGHT WINGWALLS



SECTION B-B



H = 4' thru 12' H = 13' thru 16'



REINFORCED CONCRETE WINGWALLS															
"H"	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	16'		
W	3'-2"	3'-8"	4'-2"	4'-8"	5'-2"	5'-8"	6'-2"	6'-8"	7'-2"	7'-8"	8'-2"	8'-8"	9'-2"		
C	1'-0"	1'-2"	1'-4"	1'-6"	1'-8"	1'-10"	2'-0"	2'-2"	2'-4"	2'-6"	2'-8"	2'-10"	3'-0"		
B	2'-2"	2'-6"	2'-10"	3'-2"	3'-6"	3'-10"	4'-2"	4'-6"	4'-10"	5'-2"	5'-6"	5'-10"	6'-2"		
F															
Batter	None														1/2:12
S	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-0"	1'-5"	1'-5"	1'-7"	1'-7"	1'-8"	
"c" Bars	4@24	4@18	5@20	5@14	5@10	5@7	5@7	7@8	7@6	9@15	10@15	10@15	10@15	10@11	
"d" Bars	4@24	4@18	5@20	5@14	5@10	5@7	5@7	7@8	7@6	9@15	10@15	10@15	10@15	9@13	
Conc. %	0.32	0.38	0.44	0.49	0.55	0.61	0.67	0.73	0.79	1.02	1.10	1.18	1.26		
Rein. %	13	16	19	25	30	37	49	62	76	73	90	104	125		

Quantities do not include that portion above the design "H" limit.

NOTES

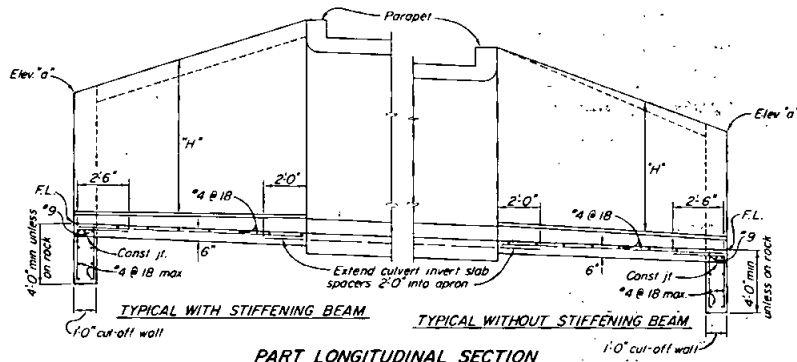
Unit Stresses: $f_s = 20,000$ p.s.i., $f_c = 1200$ p.s.i., $n = 10$

Maximum Toe Pressure = 1 1/2 Tons / sq. ft.

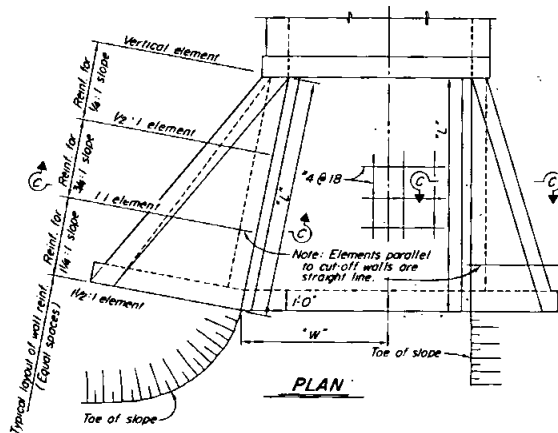
Elevations, length and angle of flare of wings may be varied by the Engineer to suit conditions encountered in the field. Walls designed for 2' live load surcharge, 1 1/2:1 sloping surcharge not to exceed 5' in elevation plus 2' live load surcharge, or unlimited 2:1 surcharge. Dimensions "H", "L", "M", "N", Elev. "a" and "Angle of flare" (as apply) are shown on the plans.

ELEVATION

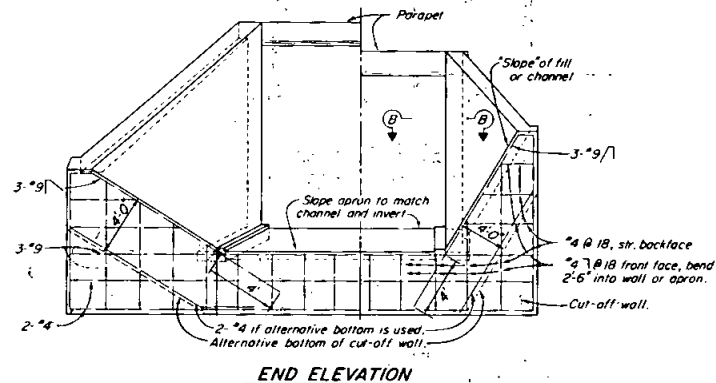
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE			
				BOX CULVERT WINGWALL TYPES A, B & C				<i>Allan A. Kerschbaum</i> Dec. 1975 Coordinator R.C.E. 19807 Date			
								DRAWING NUMBER D-79			



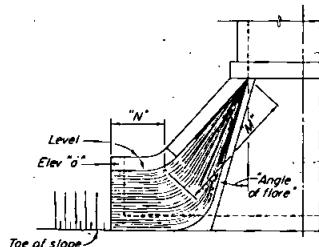
PART LONGITUDINAL SECTION



PLAN

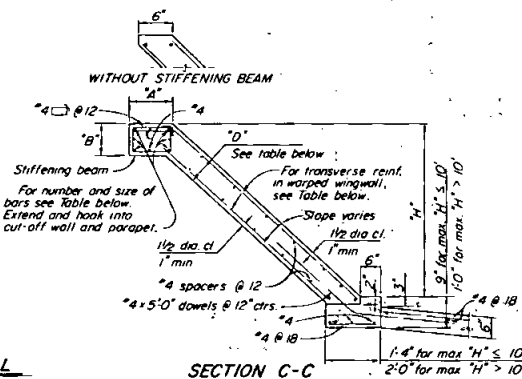


END ELEVATION



ALTERNATIVE WARPED WINGWALL

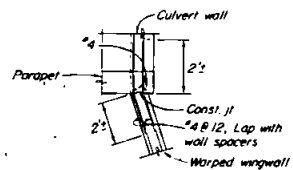
Use where additional protection to toe of embankment is required.



SECTION C-C

WARPED WINGWALLS															
WALL DIMENSIONS AND REINFORCING								STIFFENING BEAM DIMENSIONS AND REINFORCING							
Element	H	B or less	10'	12'	14'	16'	18'	20'	H	12'	14'	16'	18'	20'	25'
1/4:1	Front face reinf.	#4 @ 12"	#4 @ 7"	#5 @ 7"	#5 @ 5"	#6 @ 6"	#7 @ 7"	#7 @ 6"	6"	No beam	Place 2" x 6" in each				
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	8"	face along top of					
3/4:1	Front face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10"	#4 @ 8"	#4 @ 6"	10"	wall					
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 10"	#4 @ 7"	#4 @ 6"	12"						
1 1/4:1	Front face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	14"						
	Rear face reinf.	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	#4 @ 12"	16"						
"D" at Cut-off Wall		6"	6"	6"	7 1/2"	8"	9 1/2"	11"	18"						
"D" at Culvert		6"	6"	6"	8"	9 1/2"	11"	13"	20"						

Notes: Walls designed for 2' surcharge; earth load = 120 lb/cu ft.; equivalent fluid pressure = 36 lb/cu ft.
 Vary "D" of warped wall uniformly from that at cut-off wall to that at culvert, for max "H" > 12'.
 Where abrasion is anticipated increase apron thickness, to 7" min. to provide 2" min. reinforcement coverage.
 Dimensions "L", "W", "H", "M", "N", "Elev a", "Angle of flare", and end "Slope" (as apply) are shown on the plans.



SECTION B-B

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuschel Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER D-80

SAN DIEGO REGIONAL STANDARD DRAWING

BOX CULVERT WARPED WINGWALLS

Revision	By	Approved	Date

DESIGN NOTES

SPECIFICATIONS:

DESIGN: A A S. H. O. DATED 1973 WITH REVISIONS AND AS SUPPLEMENTED BY STATE OF CALIFORNIA BRIDGE PLANNING AND DESIGN MANUAL

SECTIONS DESIGNED FOR CULVERT IN A TRENCH ON HARD FOUNDATION, OR CULVERT UNTRENCHED ON YIELDING FOUNDATION. FOR CULVERTS ON PILES OR ROCK FOUNDATIONS, SPECIAL DESIGN WILL BE REQUIRED

LOADING:

LIVE LOAD: FOR LEGAL HIGHWAY LOADS, USE HS20-44 OR ALTERNATIVE, WITH 30% IMPACT FOR ALL COVER DEPTHS. NO IMPACT ON INVERT.

COVER LESS THAN 2' - WHEEL LOAD DISTRIBUTION ON THE TOP SLAB IS $E = 0.175S + 3.2$ LONGITUDINALLY AND CONCENTRATED ALONG THE SPAN. WHEEL LOAD DISTRIBUTION ON THE INVERT SLAB IS 7.5' LONGITUDINALLY AND UNIFORMLY OVER THE BREADTH OF THE CULVERT

COVER 2' OR MORE - WHEEL LOADS DISTRIBUTED UNIFORMLY OVER A SQUARE, THE SIDES OF WHICH ARE 175 TIMES THE DEPTH OF COVER, BUT NOT LESS LONGITUDINALLY THAN ON THE TOP SLAB, OR 7.5' ON THE INVERT SLAB WHEN SUCH AREAS FROM SEVERAL WHEEL CONCENTRATIONS OVERLAP, THE TOTAL LOAD SHALL BE CONSIDERED AS UNIFORMLY DISTRIBUTED OVER THE AREA DEFINED BY THE OUTSIDE LIMITS OF THE INDIVIDUAL AREAS, BUT THE OVERALL LONGITUDINAL DIMENSION SHALL NOT EXCEED THE TOTAL LENGTH OF THE SUPPORTING SLAB. NEGLECT LIVE LOAD ON SINGLE SPANS WHEN COVER IS MORE THAN 8' AND EXCEEDS SPAN, AND ON MULTIPLE SPANS WHEN COVER EXCEEDS DISTANCE BETWEEN EXTERIOR WALLS.

DEAD LOAD: EARTH LOAD OF 120 PCF AND AN EQUIVALENT FLUID PRESSURE OF 36 PCF, REDUCED TO 84 PCF AND 25 PCF RESPECTIVELY FOR CLEAR SPANS OF 20' OR LESS

UNIT STRESSES: $F_c = 20,000 \text{ PSI}$, $n = 10$
 $F_s = 1,200 \text{ PSI}$

REINFORCEMENT EMBEDMENT IS $1\frac{1}{2}$ DIA. CLEAR, MIN. $1'$ AND IN $\frac{1}{4}"$ INCREMENTS, EXCEPT AS NOTED.

DISTRIBUTION "g" BARS EXPRESSED AS A % OF MAIN POSITIVE REINFORCEMENT:

CLASSIFICATION "A" - TOP SLAB = $\frac{100}{\text{SPAN}}$, MAX. 50% (UNLESS TRAFFIC LONGITUDINAL)
BOTTOM SLAB = $4 \text{ @ } 18"$ MAX

CLASSIFICATION "B" TO "E": TOP AND BOTTOM SLABS $4 \text{ @ } 18"$ MAX.

GENERAL NOTES

QUANTITIES: QUANTITIES ARE FOR THE SLOPED INVERT SLAB AND DO NOT INCLUDE SPLICES IN LONGITUDINAL BARS, NOR TEMPERATURE REINFORCEMENT FOR EXPOSED TOP CULVERT, NOR CONCRETE OR REINFORCEMENT FOR PARAPETS OR CUTOFF WALLS.

SPECIAL COVERAGE: BOX STANDARD PLANS ARE NOT TO BE USED FOR CULVERTS IN A CORROSIVE ENVIRONMENT OR WHERE THERE IS A SEVERE ABRASIVE FLOW CONDITION.

DESIGNATION: SHOW ON PLANS AS SPAN X HEIGHT - STRENGTH CLASSIFICATION X LENGTH. THUS $4 \times 4 - A \times 60$, FOLLOWED BY ALTERNATIVES

ALTERNATIVES: INVERT WILL BE SLOPED UNLESS "TRAPEZOIDAL INVERT", "FLAT INVERT" OR "V INVERT" IS INCLUDED IN DESIGNATION. ENDS OF CULVERT WILL BE ROUNDED UNLESS "SQUARE ENDS" ARE DESIGNATED. PARAPETS WILL BE AS SHOWN UNLESS "FT. PARAPET" IS DESIGNATED IN PLANS. SUCH DESIGNATIONS MAY BE DIFFERENT FOR INLET AND OUTLET ENDS.

REINFORCEMENT: MAIN REINFORCEMENT IS POSITIONED TRANSVERSE OR, FOR CURVED CULVERTS, RADIAL, WHEN RADIAL REINFORCING SPACING IS MEASURED ALONG THE ϵ .

CONSTRUCTION NOTES

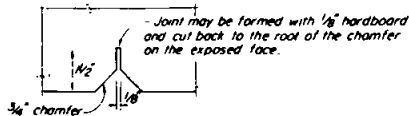
EXPANSION JOINTS: BOTTOM SLAB - NO EXPANSION JOINTS SHALL BE PLACED. TOP SLAB AND WALLS - WHEN COVER IS LESS THAN SPAN LENGTH, PLACE $1\frac{1}{2}$ " EXPANSION JOINT FILLER AT 30'± CENTERS OUTSIDE THE PAVED ROADWAY LANES AND PLACE BRIDGE DETAIL 3-2 AT 30'± CENTERS UNDER PAVED ROADWAY LANES. WHEN COVER IS MORE THAN SPAN LENGTH, PLACE $1\frac{1}{2}$ " EXPANSION JOINT FILLER AT 30'± CENTERS AND ADDITIONAL $1\frac{1}{2}$ " EXPANSION JOINTS AT LOCATIONS OF CHANGE IN FOUNDATION CHARACTER, AS DIRECTED BY THE ENGINEER.

CONSTRUCTION LOADS:

NOT PERMITTED UNTIL CONCRETE HAS REACHED A STRENGTH OF 3,000 PSI OR AGE OF 28 DAYS, WHICHEVER OCCURS FIRST, AND FALSEWORK PLANS HAVE BEEN SUBMITTED BY THE CONTRACTOR TO THE ENGINEER AND APPROVED

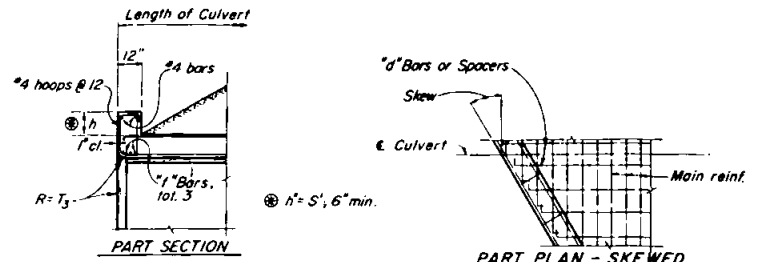
CONSTRUCTION JOINTS:

TEMPORARY JOINTS MAY BE PERMITTED IF NORMAL (OR RADIAL) TO ϵ OF RCB. OTHERWISE, THE CONTRACTOR IS TO SUBMIT A PROPOSAL FOR CONSIDERATION

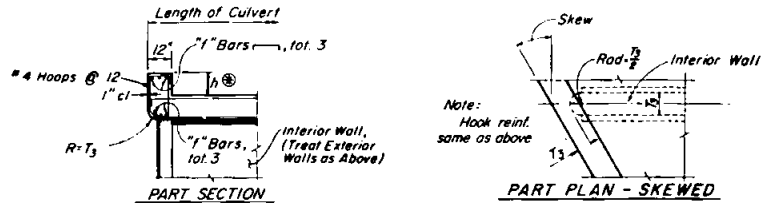


BRIDGE DETAIL 3-2
(Portion)

See Standard Drawing C-15

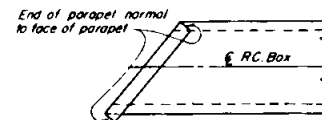


PARAPET DETAILS FOR SINGLE SPAN CULVERTS

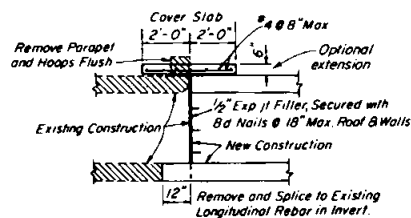


PARAPET DETAILS FOR MULTIPLE SPAN CULVERTS

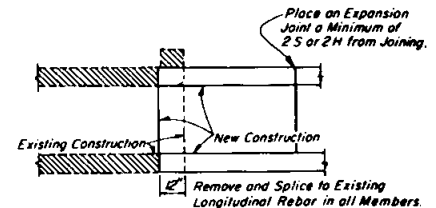
SPAN	PARAPET "I" BAR NOS		
	0° TO 15°	16° TO 30°	31° TO 45°
4'	*4	*4	*4
6'	*4	*4	*5
8'	*4	*5	*6
10'	*5	*6	*7
12'	*6	*7	*8
14'	*7	*8	*9



PARAPET DETAIL FOR SKEWED CULVERTS W/O WINGWALLS



COVER: 1' AND GREATER



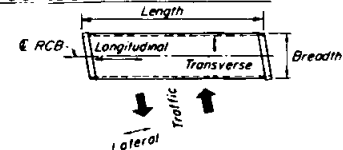
COVER: EXPOSED TOP AND GREATER

CULVERT EXTENSION
20° SKEW MAXIMUM

USE OF STANDARD DRAWING

"STRENGTH CLASSIFICATION", SYMBOLIZED BY THE LETTERS "A", "B", "C" ETC., AT THE TOP OF THE DATA TABLE IS MERELY A CONVENIENT DESIGNATION FOR A PARTICULAR STRUCTURAL SECTION FOR A CULVERT OF ANY GIVEN OPENING. IT IS DICTATED BY THE COVER OR DEPTH OF FILL OVER THE TOP SLAB.

LIVE LOAD & RCB DIRECTIONAL TERMINOLOGY



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

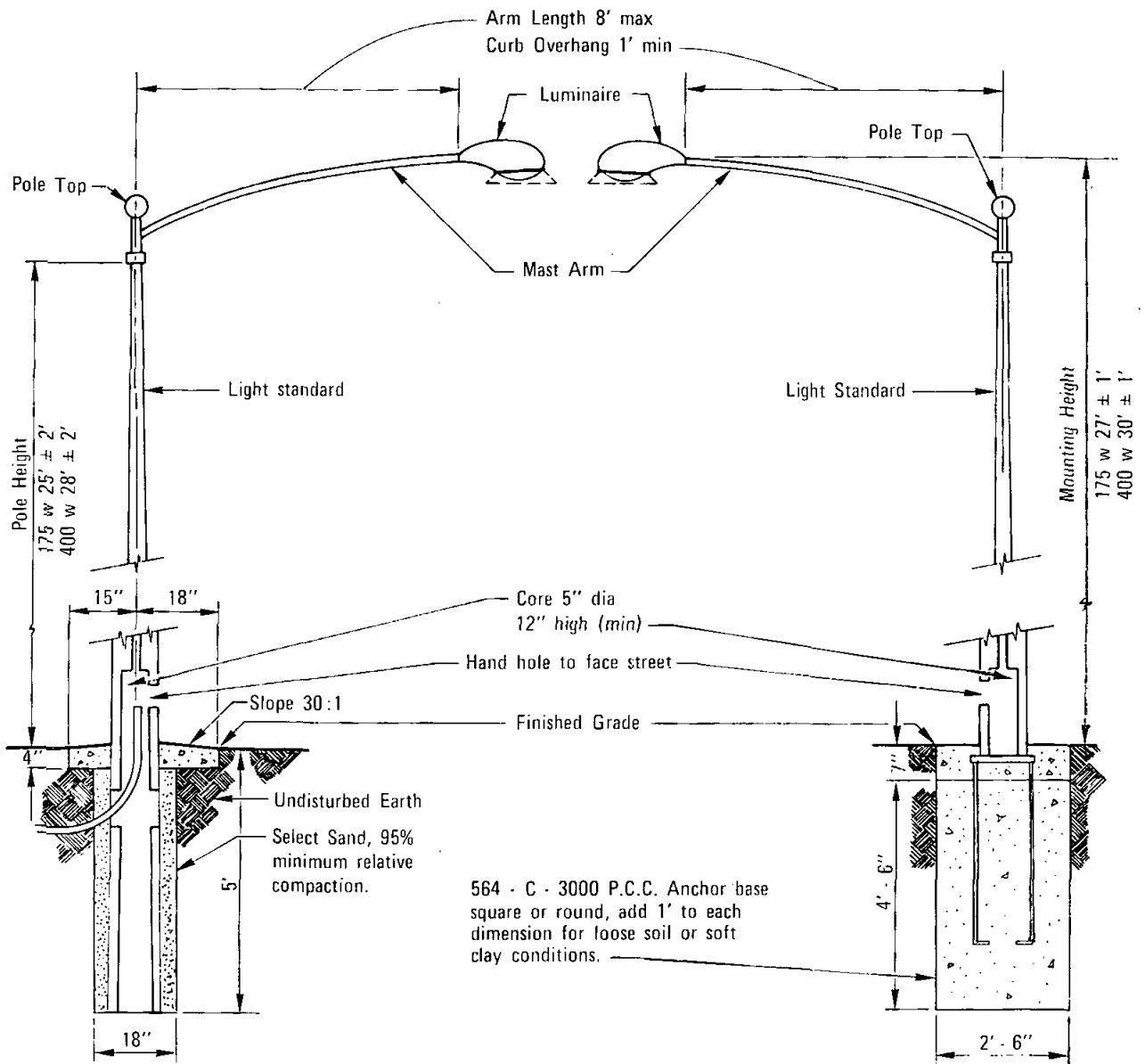
BOX CULVERT MISCELLANEOUS DETAILS

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen A. Kuehnert Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **D-81**

ELECTRICAL SYSTEMS



DIRECT BURIAL FOUNDATION

ANCHOR BASE FOUNDATION

Finished Grade
Anchor bolts must not protrude.

1/4" minimum bolt clearance

Anchor Bolts (4 req.) 1"x 36"x 4" hook, galv.
Use two leveling nuts with washers (all galv.) on each bolt.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

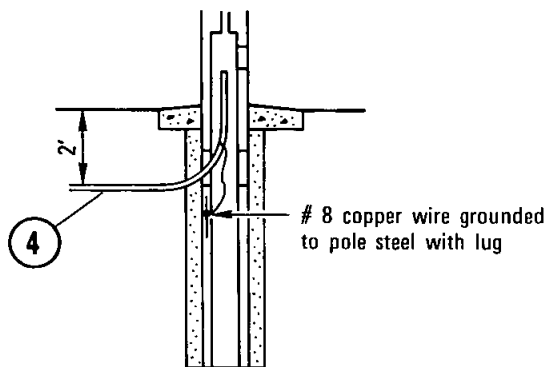
ORNAMENTAL STREET LIGHT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

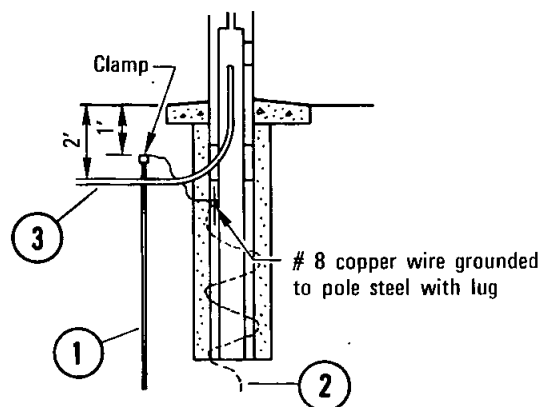
Allen A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER**

E-1

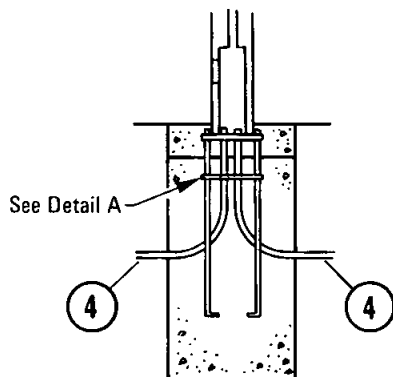


STEEL CONDUIT

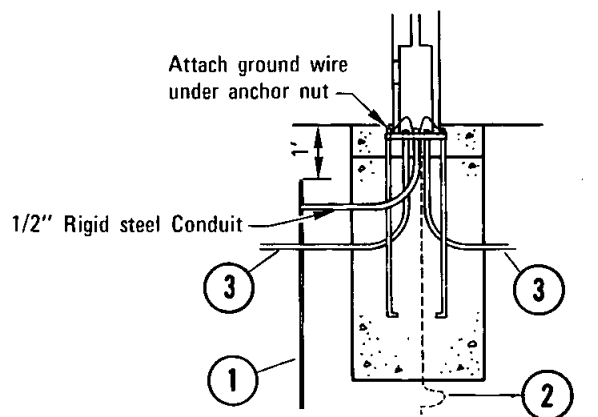


NON-METALLIC CONDUIT

DIRECT BURIAL FOUNDATION



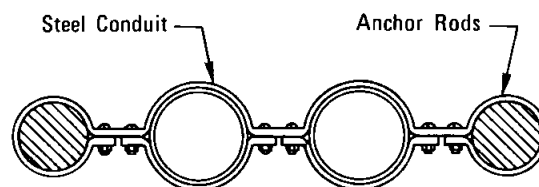
STEEL CONDUIT



NON-METALLIC CONDUIT

ANCHOR BASE FOUNDATION

- ① 3/4"x 8' copper covered steel ground rod.
- ② Alternate Ground: 15' no. 4 bare stranded copper wire, coiled.
- ③ Approved non-metallic conduit.
- ④ Steel conduit.



DETAIL A

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

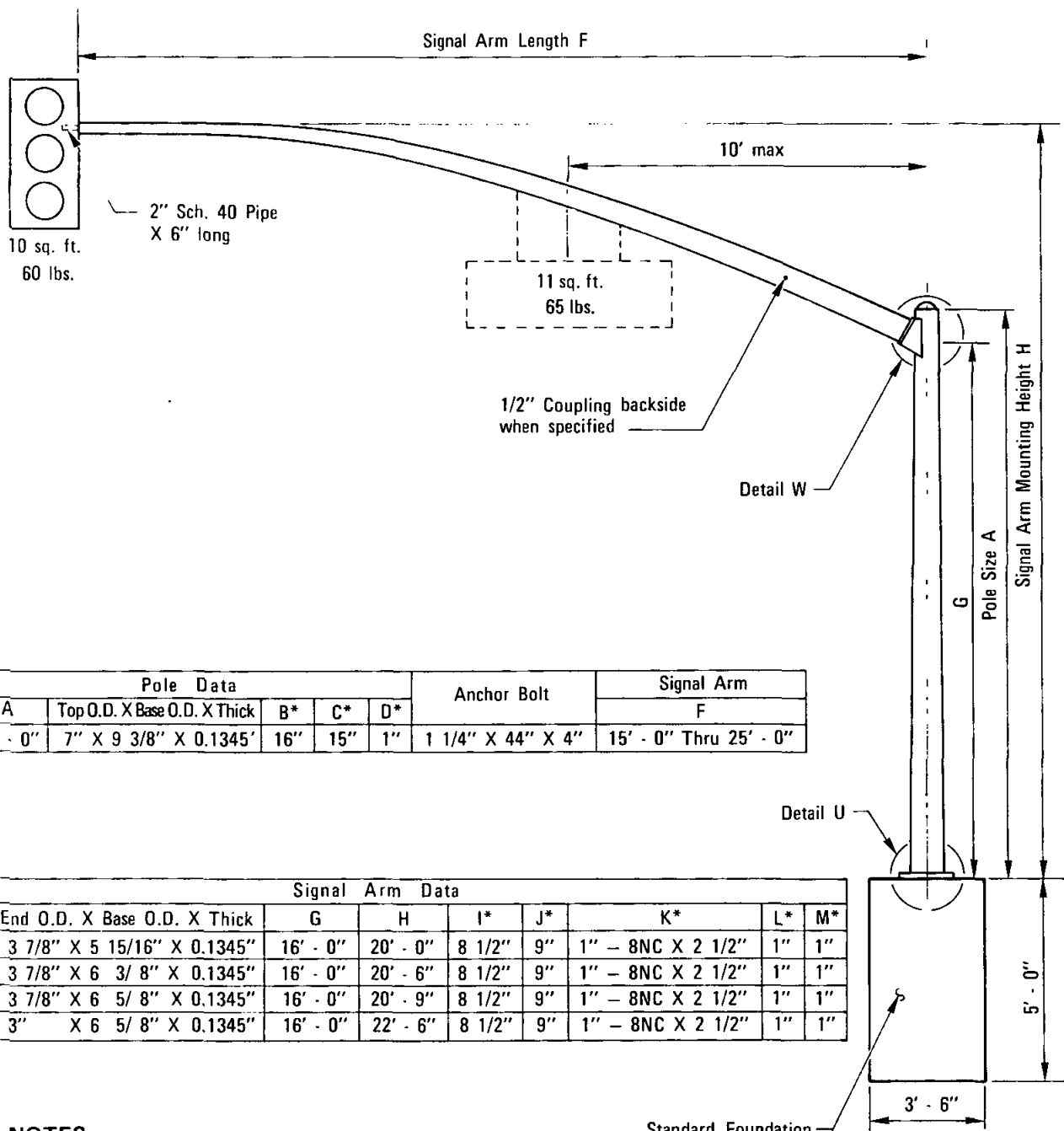
DRAWING
NUMBER

E-2

SAN DIEGO REGIONAL STANDARD DRAWING

GROUNDING
OF CONCRETE LIGHTING STANDARDS

Revision	By	Approved	Date



Pole Type	Pole Data					Anchor Bolt	Signal Arm F
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		
100	17' - 0"	7" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	15' - 0" Thru 25' - 0"

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
15' - 0"	3 7/8" X 5 15/16" X 0.1345"	16' - 0"	20' - 0"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
18' - 0"	3 7/8" X 6 3/8" X 0.1345"	16' - 0"	20' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
20' - 0"	3 7/8" X 6 5/8" X 0.1345"	16' - 0"	20' - 9"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
25' - 0"	3" X 6 5/8" X 0.1345"	16' - 0"	22' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

William G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

E-8

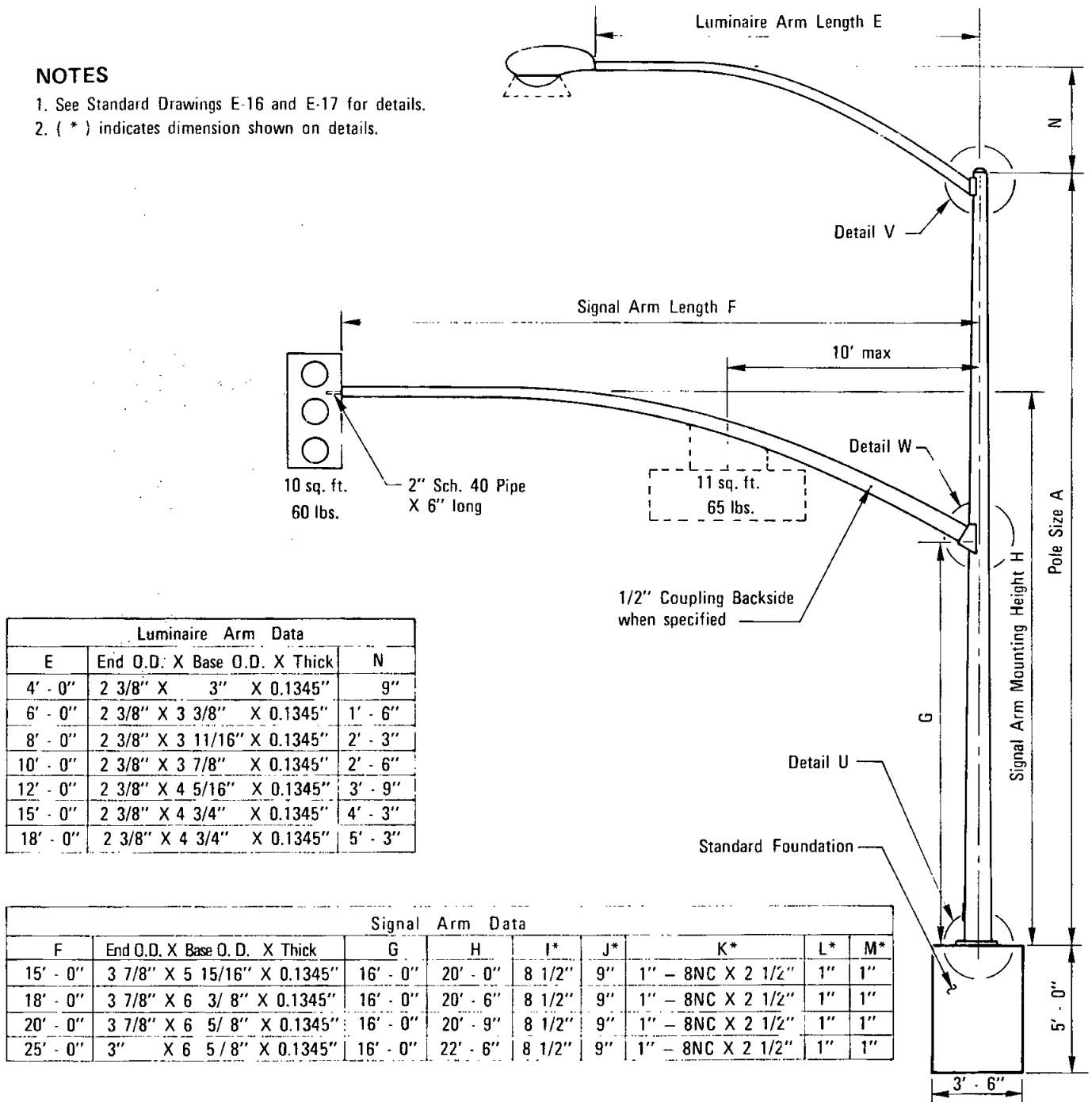
SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL STANDARD
TYPE 100

Revision	By	Approved	Date
Foundation	SC	D. S.	7-79

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.



Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
15' - 0"	3 7/8" X 5 15/16" X 0.1345"	16' - 0"	20' - 0"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
18' - 0"	3 7/8" X 6 3/8" X 0.1345"	16' - 0"	20' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
20' - 0"	3 7/8" X 6 5/8" X 0.1345"	16' - 0"	20' - 9"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"
25' - 0"	3" X 6 5/8" X 0.1345"	16' - 0"	22' - 6"	8 1/2"	9"	1" - 8NC X 2 1/2"	1"	1"

Pole Type	Pole Data					Anchor Bolt	Luminaire Arm	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		E	F
101	30' - 0"	5 1/4" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	4' - 0" Thru 18' - 0"	15' - 0" Thru 25' - 0"
102	35' - 0"	4 1/2" X 9 3/8" X 0.1345"	16"	15"	1"	1 1/4" X 44" X 4"	4' - 0" Thru 18' - 0"	15' - 0" Thru 25' - 0"

Revision	By	Approved	Date
Foundation	✓	D. S.	7-79

SAN DIEGO REGIONAL STANDARD DRAWING

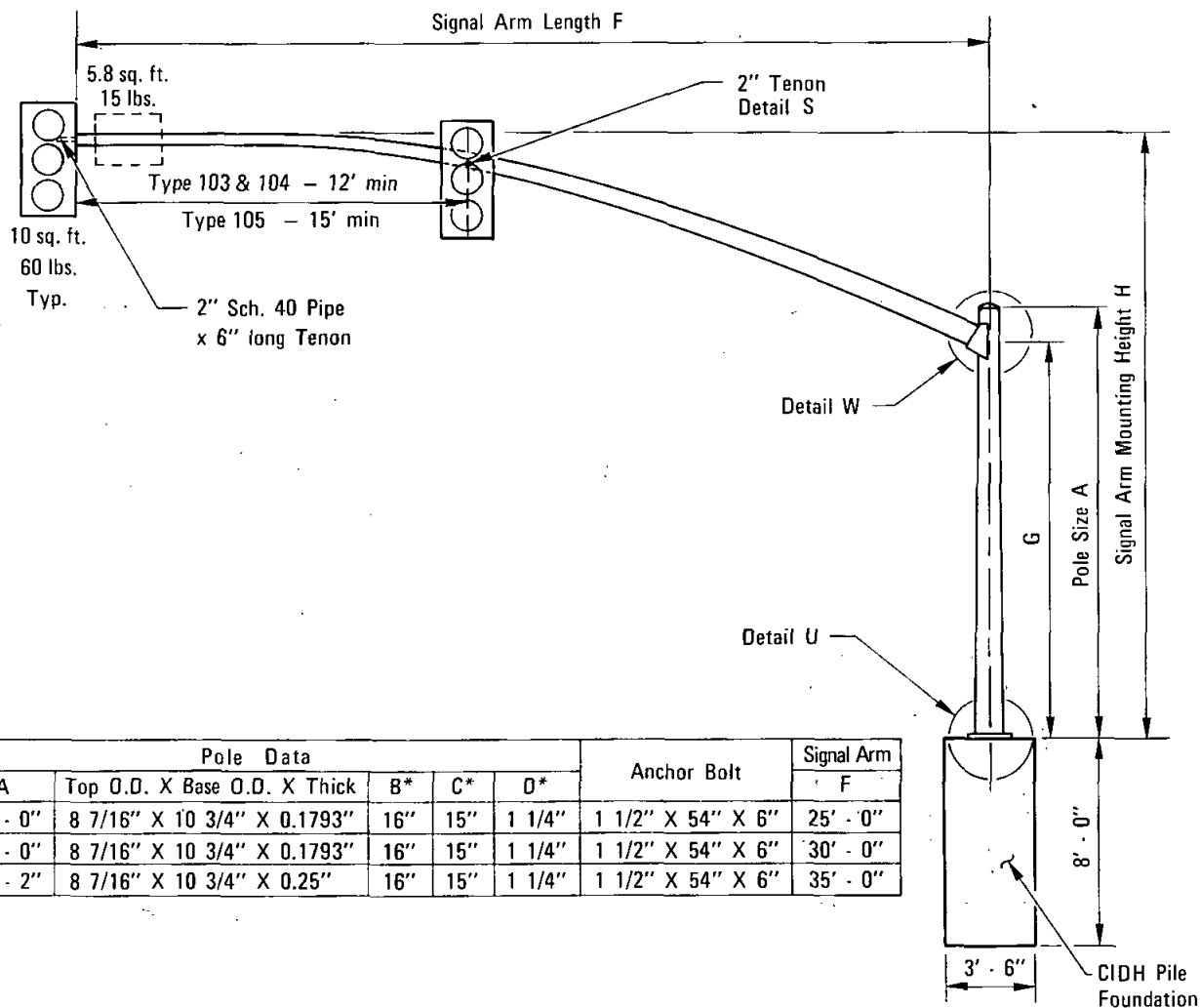
**TRAFFIC SIGNAL AND STREET LIGHTING
STANDARDS - TYPES 101 AND 102**

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

E-9



Pole Type	Pole Data					Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		F
103	17' - 0"	8 7/16" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	25' - 0"
104	17' - 0"	8 7/16" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	30' - 0"
105	16' - 2"	8 7/16" X 10 3/4" X 0.25"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	35' - 0"

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*	
25' - 0"	3 7/8" X 7 5/16" X 0.1793"	16' - 0"	22' - 6"	10 1/2"	11"	1" - 8NC X 2 1/2"	1"	1 1/4"	
30' - 0"	3 7/8" X 8" X 0.1793"	16' - 0"	23' - 0"	10 1/2"	11"	1" - 8NC X 2 1/2"	1"	1 1/4"	
35' - 0"	3 7/8" X 8 11/16" X 0.1793"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **E-10**

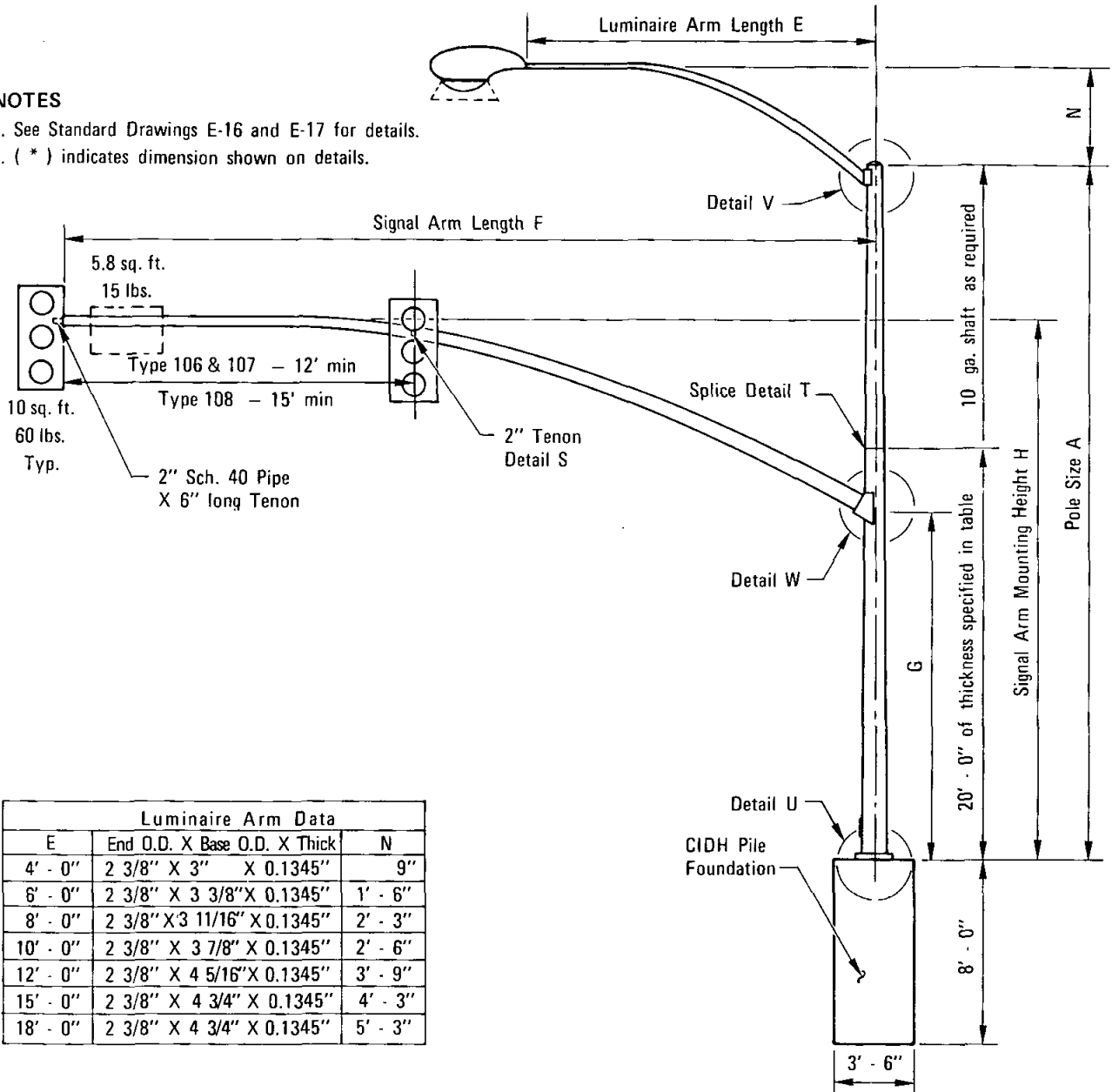
SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL STANDARDS TYPES 103, 104 AND 105

Revision By Approved Date

NOTES

1. See Standard Drawings E-16 and E-17 for details.
2. (*) indicates dimension shown on details.

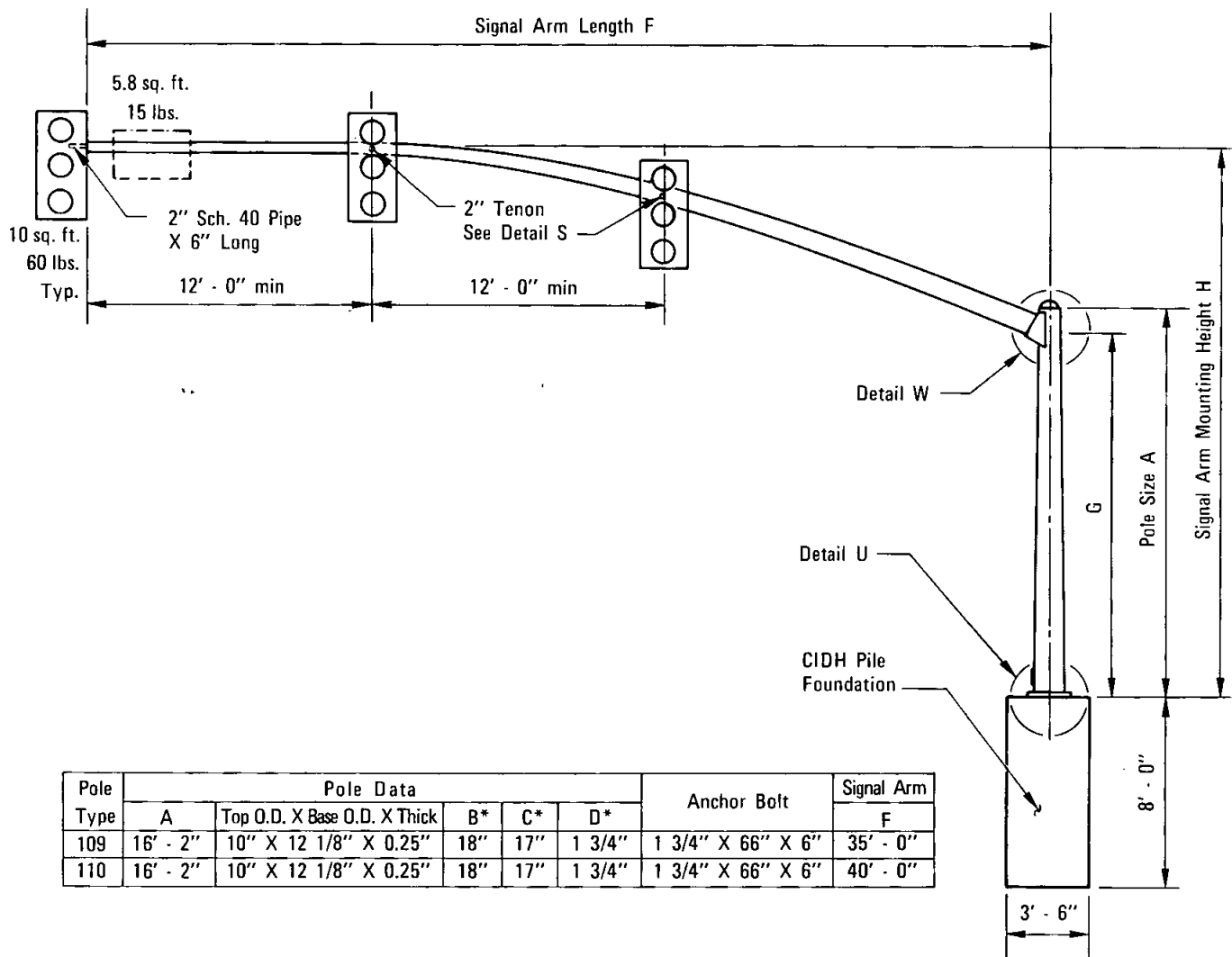


Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	

Pole Type	Pole Data					Anchor Bolt	Luminaire Arm	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		E	F
106	30' - 0"	6 5/8" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	25' - 0"
107	30' - 0"	6 5/8" X 10 3/4" X 0.1793"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	30' - 0"
108	30' - 0"	6 5/8" X 10 3/4" X 0.25"	16"	15"	1 1/4"	1 1/2" X 54" X 6"	4' Thru 18'	35' - 0"

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*
25' - 0"	3 7/8" X 7 5/16" X 0.1793"	16' - 0"	22' - 6"	10 1/2"	11"	1"- 8NC X 2 1/2"	1"	1 1/4"
30' - 0"	3 7/8" X 8" X 0.1793"	16' - 0"	23' - 0"	10 1/2"	11"	1"- 8NC X 2 1/2"	1"	1 1/4"
35' - 0"	3 7/8" X 8 11/16" X 0.1793"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 106, 107 AND 108		<i>Alfred A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER E-11	



Pole Type	Pole Data					Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		F
109	16' - 2"	10" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"	35' - 0"
110	16' - 2"	10" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"	40' - 0"

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*	
35' - 0"	3 7/8" X 8 11/16" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	
40' - 0"	3 7/8" X 9 3/8" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimension shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

E-12

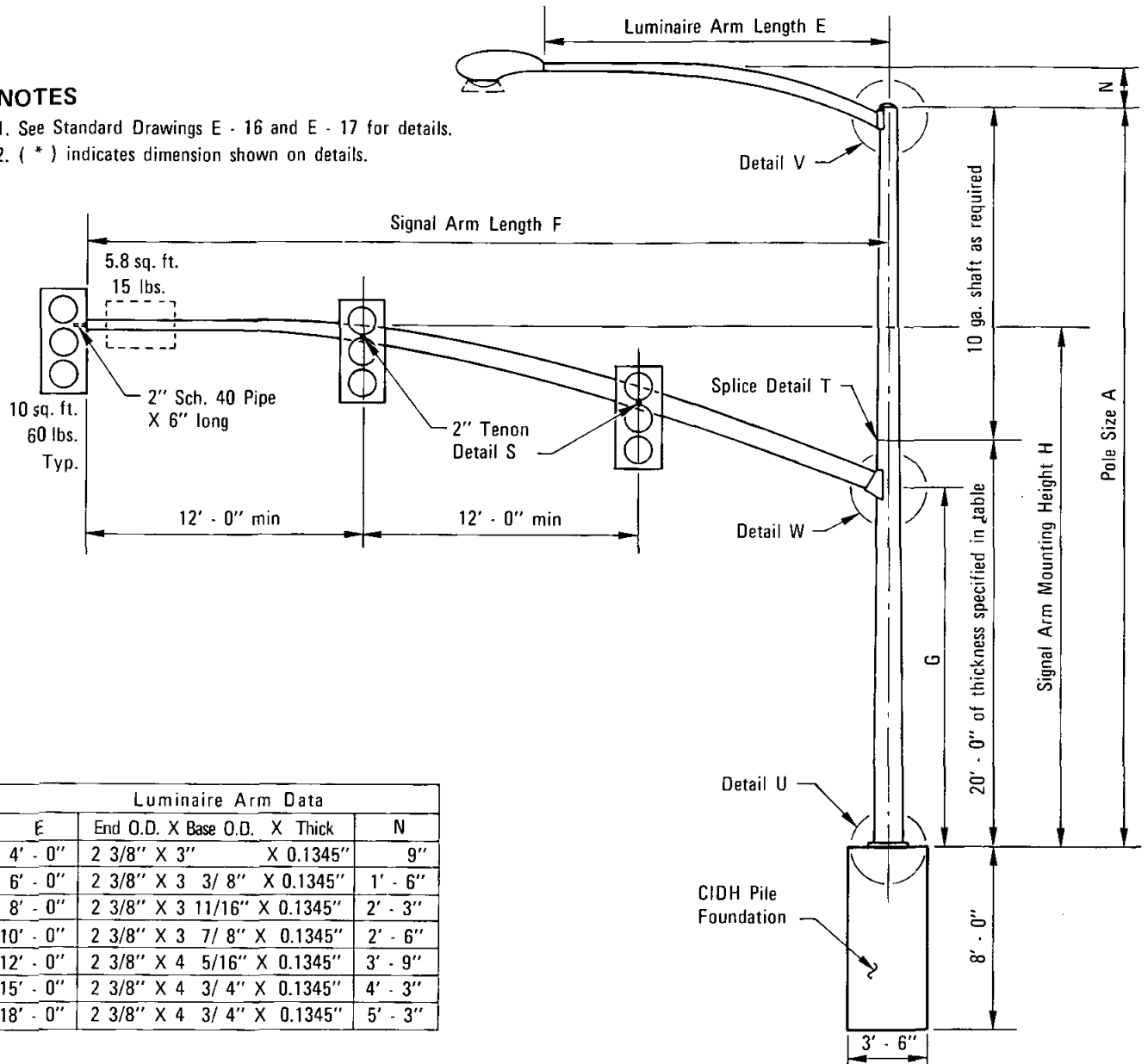
SAN DIEGO REGIONAL STANDARD DRAWING

**TRAFFIC SIGNAL STANDARDS
TYPES 109 AND 110**

Revision	By	Approved	Date

NOTES

1. See Standard Drawings E - 16 and E - 17 for details.
2. (*) indicates dimension shown on details.

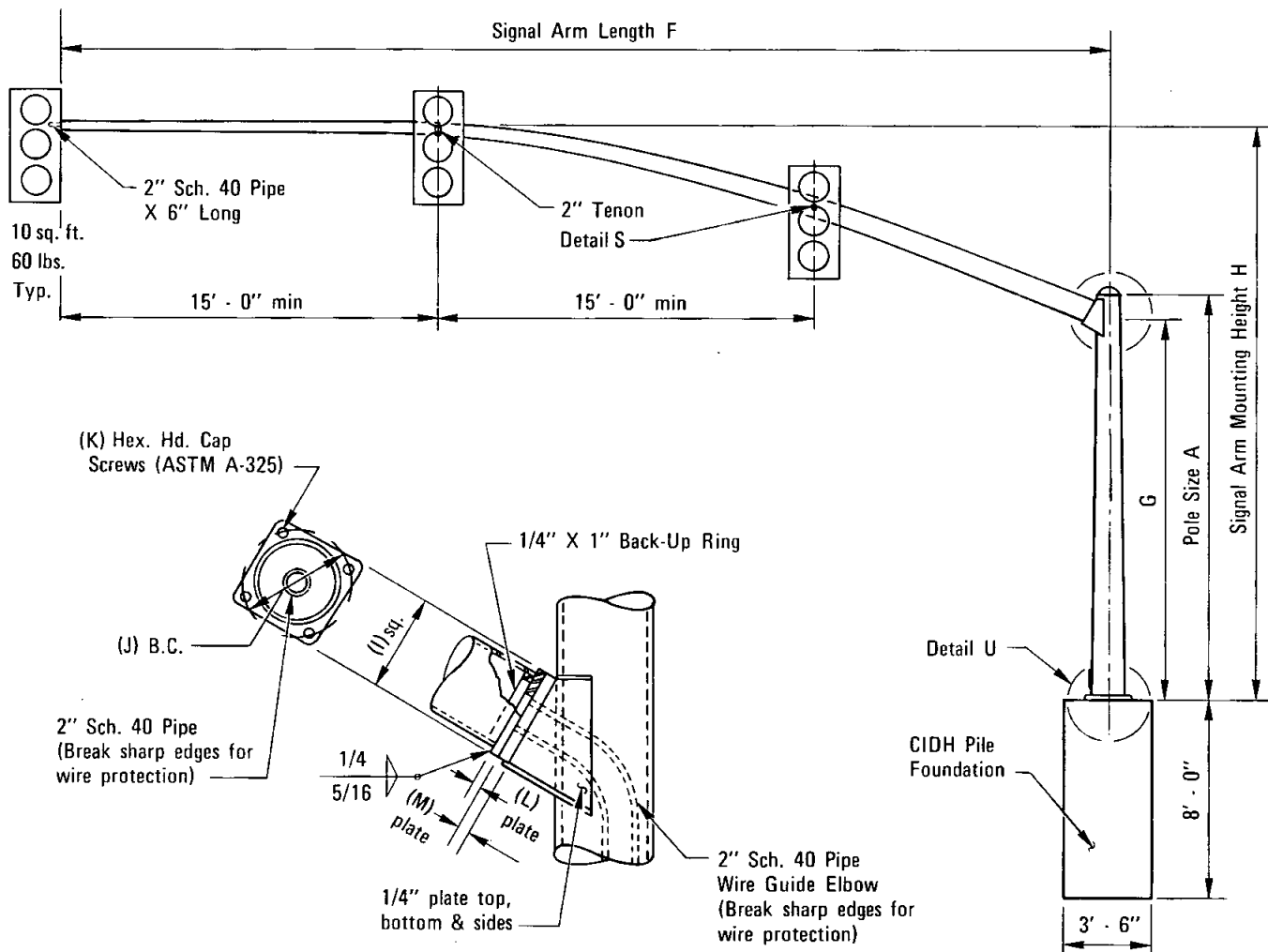


Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	

Pole Type	Pole Data					Anchor Bolt	Luminaire Arm	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*		E	F
111	30' - 0"	8" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"	4' Thru 18'	35' - 0"
112	30' - 0"	8" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 66" X 6"	4' Thru 18'	40' - 0"

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I*	J*	K*	L*	M*	
35' - 0"	3 7/8" X 8 11/16" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	
40' - 0"	3 7/8" X 9 3/8" X 0.25"	15' - 2"	23' - 0"	12"	12"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 111 AND 112		<i>Alfred A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
				DRAWING NUMBER		E-13	



SIGNAL ARM CONNECTION

Pole Type	Pole Data						Anchor Bolt	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*	F		
113	16' - 2"	9 15/16" X 12 1/8" X 0.25"	18"	17"	1 3/4"	1 3/4" X 60" X 6"	45' - 0"	

Signal Arm Data								
F	End O.D. X Base O.D. X Thick	G	H	I	J	K	L	M
45' - 0"	3 7/8" X 10 1/16" X 0.25"	15' - 2"	22' - 6"	13"	13"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"

NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimensions shown on details.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

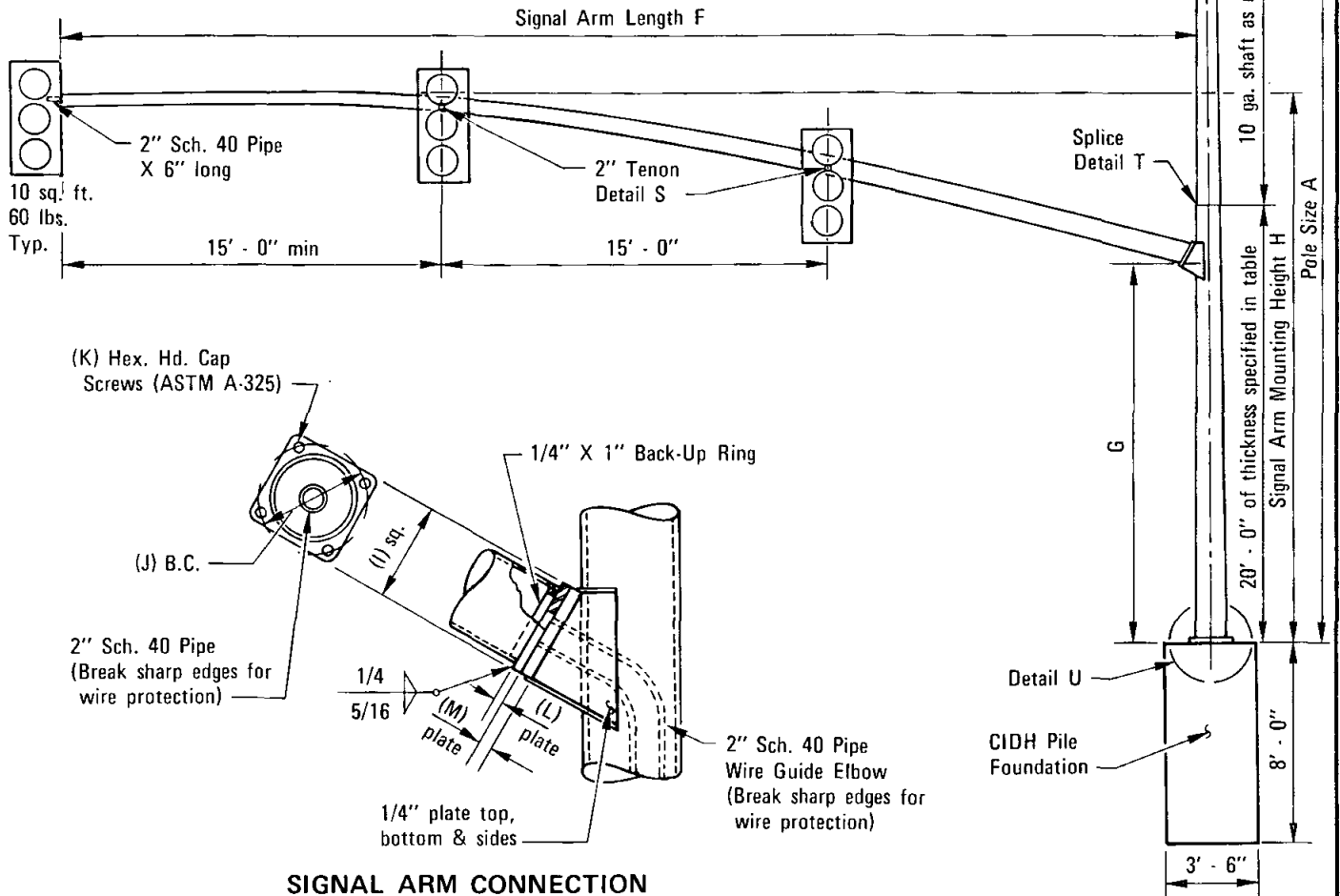
DRAWING
NUMBER **E-14**

SAN DIEGO REGIONAL STANDARD DRAWING

TRAFFIC SIGNAL STANDARD TYPE 113

Revision	By	Approved	Date

Luminaire Arm Data			
E	End O.D. X Base O.D. X Thick	N	
4' - 0"	2 3/8" X 3" X 0.1345"	9"	
6' - 0"	2 3/8" X 3 3/8" X 0.1345"	1' - 6"	
8' - 0"	2 3/8" X 3 11/16" X 0.1345"	2' - 3"	
10' - 0"	2 3/8" X 3 7/8" X 0.1345"	2' - 6"	
12' - 0"	2 3/8" X 4 5/16" X 0.1345"	3' - 9"	
15' - 0"	2 3/8" X 4 3/4" X 0.1345"	4' - 3"	
18' - 0"	2 3/8" X 4 3/4" X 0.1345"	5' - 3"	



SIGNAL ARM CONNECTION

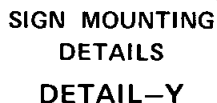
Pole Type	Pole Data						Anchor Bolt	Luminaire Arm	Signal Arm
	A	Top O.D. X Base O.D. X Thick	B*	C*	D*			E	F
114	30' - 0"	8" X 12 1/8" X 0.25"	18"	17"	1 3/4"		1 3/4" X 60" X 6"	4' - 0" Thru 18' - 0"	45' - 0"
115	35' - 0"	7 1/8" X 12 1/8" X 0.25"	18"	17"	1 3/4"		1 3/4" X 60" X 6"	4' - 0" Thru 18' - 0"	45' - 0"

Signal Arm Data									
F	End O.D. X Base O.D. X Thick	G	H	I	J	K	L	M	
45' - 0"	3 7/8" X 10 1/16" X 0.25"	15' - 2"	22' - 6"	13"	13"	1 1/4" - 7NC X 3"	1 1/4"	1 1/2"	

NOTES

- See Standard Drawings E-16 and E-17 for details.
- (*) indicates dimension shown on details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING STANDARDS - TYPES 114 AND 115				Coordinator	Date
								DRAWING NUMBER	E-15

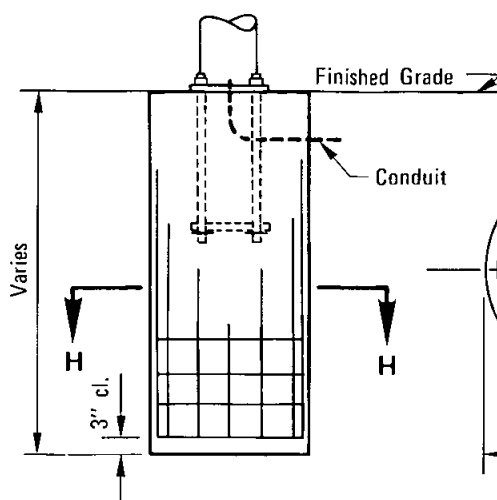


1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section 2 3/8" O.D. for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
2. Signal arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot. Extensions of 2" standard pipe about 4" long may be added to accommodate signal mounting hardware.
3. Sheet and plate thickness shown is nominal thickness.
4. Handhole reinforcement ring to be 1/4" X 1 1/2" for 0.1345" to 0.2500" poles, 3/8" X 2" for 0.3125".
5. In lieu of the torque requirements for H.S. bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from a snug tight condition. No washer will be required.
6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.

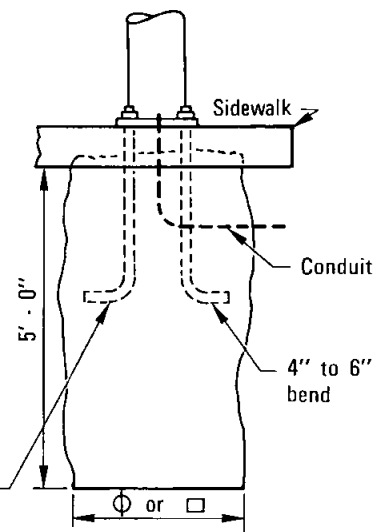
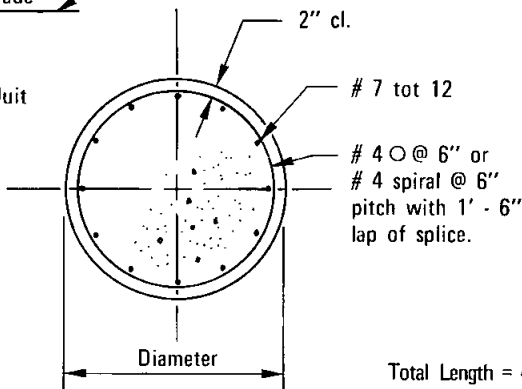
E-16

TRAFFIC SIGNAL AND STREET LIGHTING DETAILS

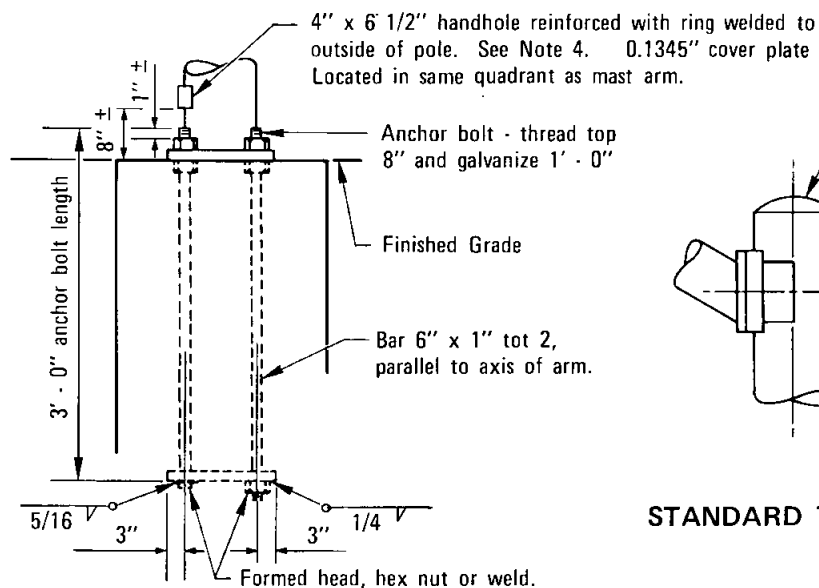
Revision	By	Approved	Date



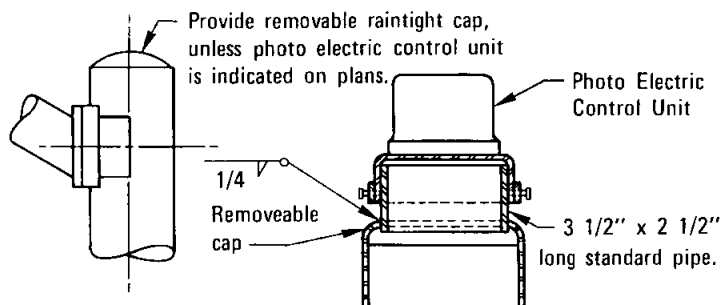
**ELEVATION
CAST-IN-DRILLED HOLE PILE FOUNDATION**



**ELEVATION
STANDARD FOUNDATION**



HANDHOLE AND ANCHORAGE DETAILS



**STANDARD TOP MOUNTING ADAPTER FOR
PHOTO ELECTRIC CONTROL UNIT**

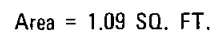
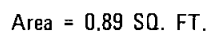
POLE TOP DETAILS

NOTES

1. Luminaire arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot, with an end section, 2 3/8" O.D., for mounting hardware. Extensions of 2" standard pipe about 7" long may be used at the option of the manufacturer.
2. Signal arms shall be round, tapered steel tubes, maximum taper 0.14 inches per foot. Extensions of 2" standard pipe about 4" long may be added to accommodate signal mounting hardware.
3. Sheet and plate thickness shown is nominal thickness.
4. Handhole reinforcement ring to be 1/4" X 1 1/2" for 0.1345" to 0.2500" poles, 3/8" X 2" for 0.3125".
5. In lieu of the torque requirements for H.S. bolts, cap screws shall be tightened by the turn-of-nut method 1/6 turn from a snug tight condition. No washer will be required.
6. 4 anchor bolts are required for each pole. Provide a hex nut, leveling nut and 2 washers for each anchor bolt.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRAFFIC SIGNAL AND STREET LIGHTING DETAILS		Allen A. Kuehn	Dec. 1975
						Coordinator	R.C.E. 19807 Date
						DRAWING NUMBER	E-17

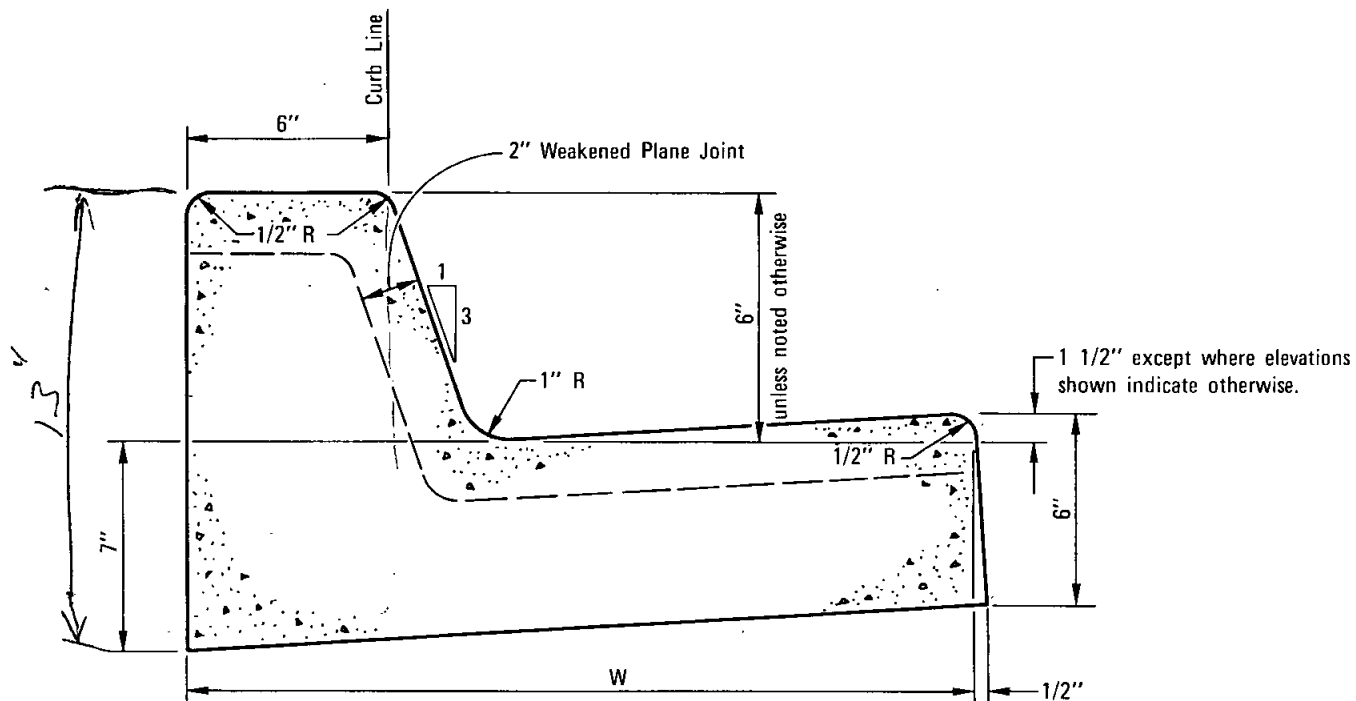
GENERAL SURFACE IMPROVEMENTS



6" curb

1. Concrete shall be 517 - C - 2500.
2. See Standard Drawing G-10 for joint details.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 1980? Date
				CURBS AND GUTTER - SEPARATE	DRAWING NUMBER G-1



TYPE G & H CURB

TYPE	W	* AREA SQ. FT.
G	24"	1.34
H	30"	1.61

* with 6" Curb Face

NOTES:

1. Concrete shall be 517 - C - 2500.
2. See Standard Drawing G-10 for joint details.

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CURB AND GUTTER - COMBINED

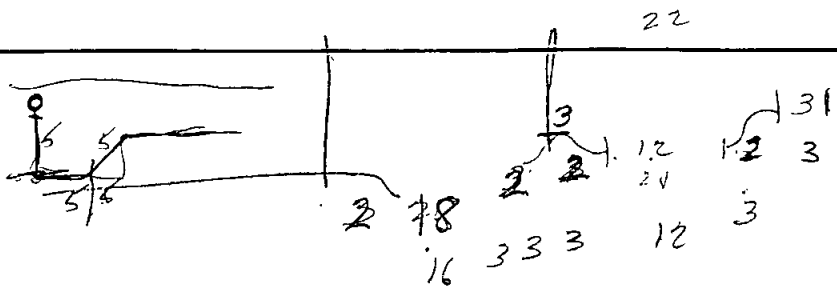
DRAWING
NUMBER

G-2

Revision	By	Approved	Date

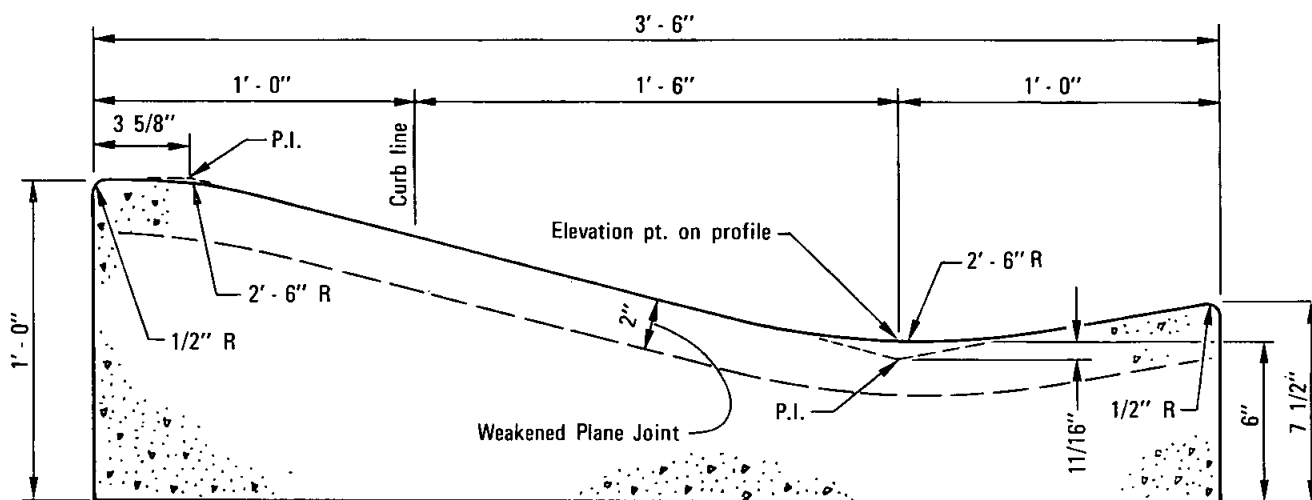
3 1/2
94/517
97/0
1

5/10
15-
34
60
25-5



1. Concrete shall be 517-C-2500.
2. See Standard Drawing G-10 for joint details.
3. Monolithic curb, gutter and sidewalk is to be used with Agency approval only.

Revision	By	Approved	Date	<div style="text-align: center;"> <p>SAN DIEGO REGIONAL STANDARD DRAWING</p> <p>MONOLITHIC CURB, GUTTER AND SIDEWALK</p> </div>	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Alfred A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 1980? Date
Thickness	<i>2</i>	<i>0.5</i>	<i>7-79</i>		<div style="text-align: center;"> <p>DRAWING NUMBER G-3</p> </div>



CURB AREA
(2.33 sq. ft.)

NOTES

1. Transition to type G curb at all curb returns, except where sidewalk ramps are provided, and at all cul-de-sacs with drainage structures.
2. See Standard Drawing D-6 for Rolled Curb Inlet.
3. Concrete shall be 517 - C - 2500.
4. See Standard Drawing G-10 for joint details.

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

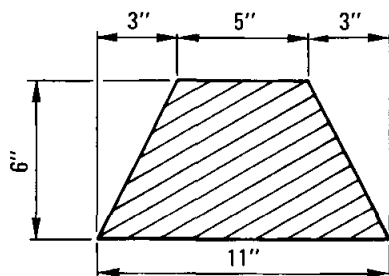
SAN DIEGO REGIONAL STANDARD DRAWING

CURB AND GUTTER - ROLLED

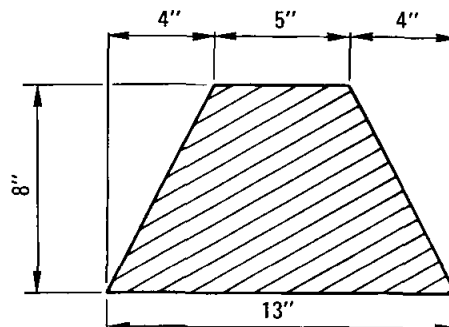
**DRAWING
NUMBER**

G-4

Revision	By	Approved	Date

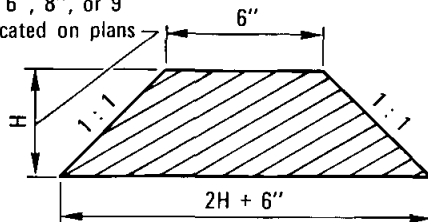


TYPE A-SECTION

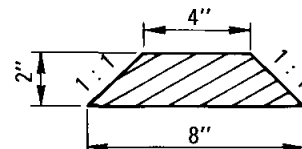


TYPE B-SECTION

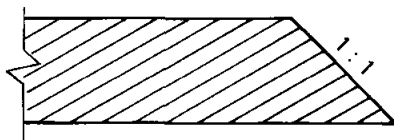
Height 6", 8", or 9"
as indicated on plans



TYPE C-SECTION



TYPE D-SECTION



ALL TYPES—SIDE VIEW

Slope end of dike 1 : 1
when not joining
other improvements

APPROX. DIKE QUANTITIES	
TYPE	TONS/LIN. FT.
A	0.0250
B	0.0375
C-6"	0.0375
C-8"	0.0583
C-9"	0.0702
D	0.0062

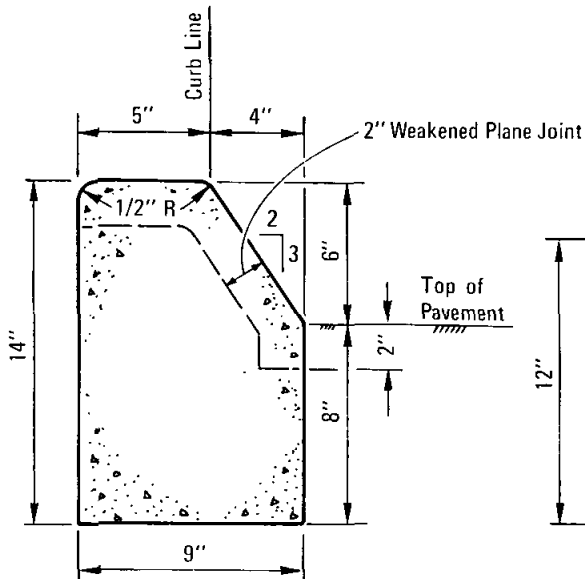
NOTES

1. Dike is to be placed on a minimum 2" of A.C. road surfacing, extending throughout the width of the dike.
2. AR-8000 grade asphalt to be used for all dikes
3. A.C. dikes may be shaped and compacted with an extrusion machine or other equipment capable of shaping and compacting the material to the required cross section.

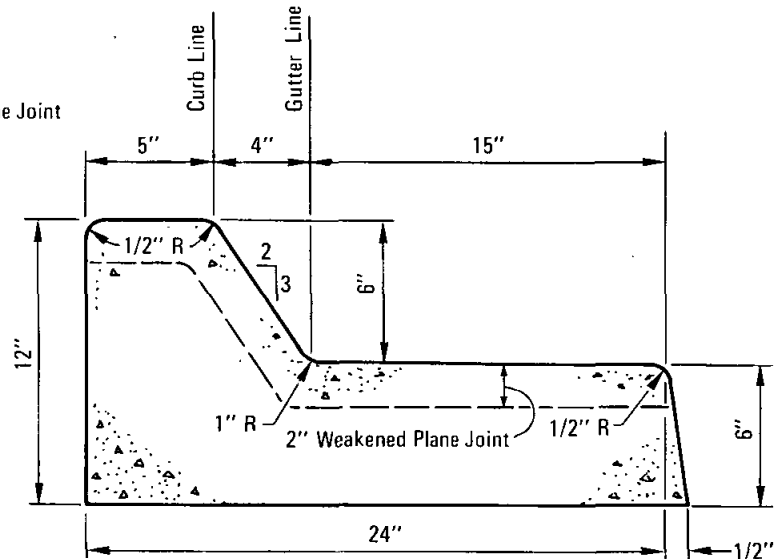
LEGEND ON PLANS

— Type A Dike

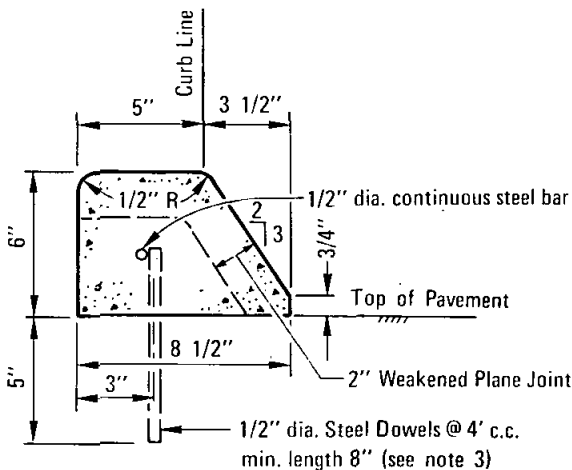
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				DIKES (BERMS) - ASPHALT CONCRETE		<i>Allard A. Kersch</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER G-5	



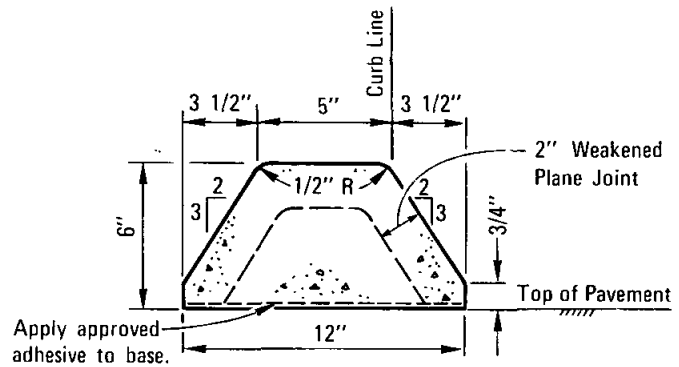
B-1
AREA = 0.79 SQ.FT.



B-2
AREA = 1.29 SQ.FT.



B-3
AREA = 0.29 SQ.FT.



B-4
AREA = 0.35 SQ.FT.

NOTES

- Concrete shall be 517-C-2500.
- See Standard Drawing G-10 for joint details.
- Extruded type B-3 curb shall be anchored to existing pavement by placing steel dowels and reinforcing steel as shown or by using an approved adhesive.

LEGEND ON PLANS

Type B-2 Curb and Gutter

Type B-1, B-3, B-4 Curb

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

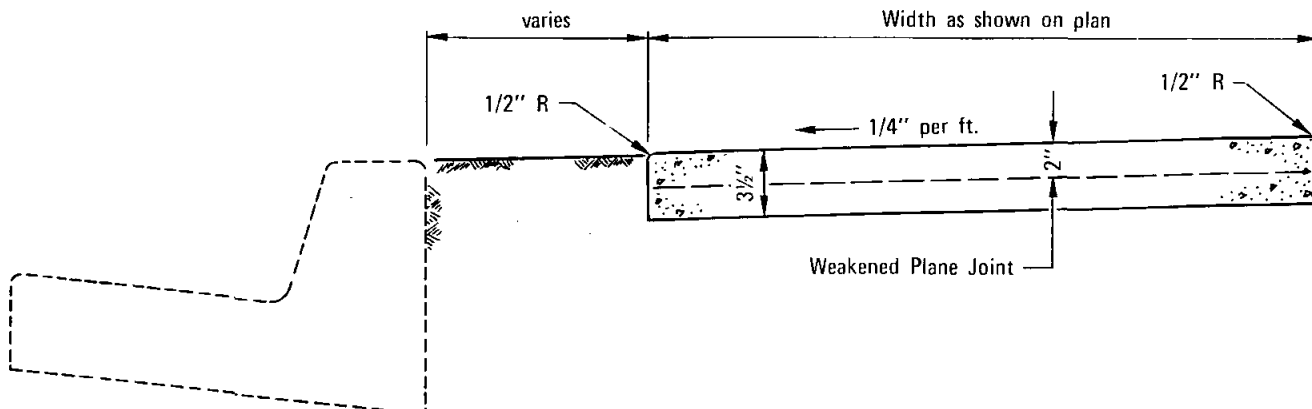
William A. Kuehner Dec. 1975
Coordinator R.C.L. 19807 Date

DRAWING
NUMBER **G-6**

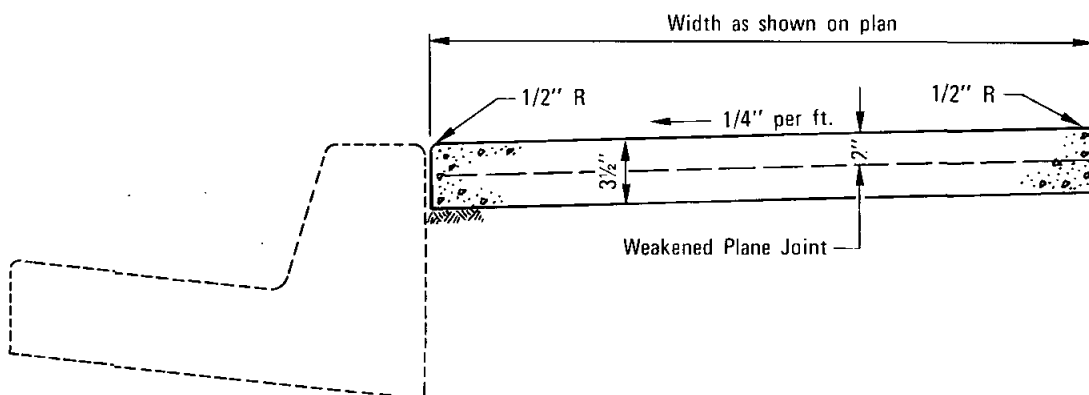
SAN DIEGO REGIONAL STANDARD DRAWING

CURBS AND GUTTER - MEDIANS

Revision	By	Approved	Date
Note 1	<i>CS</i>	<i>D.S.</i>	7.79



NON-CONTIGUOUS



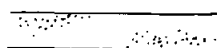
CONTIGUOUS

2
94
470

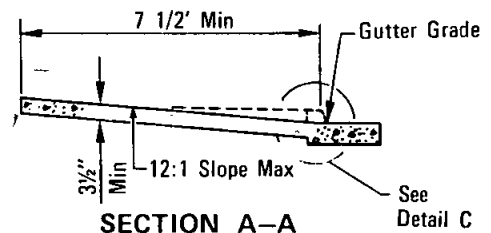
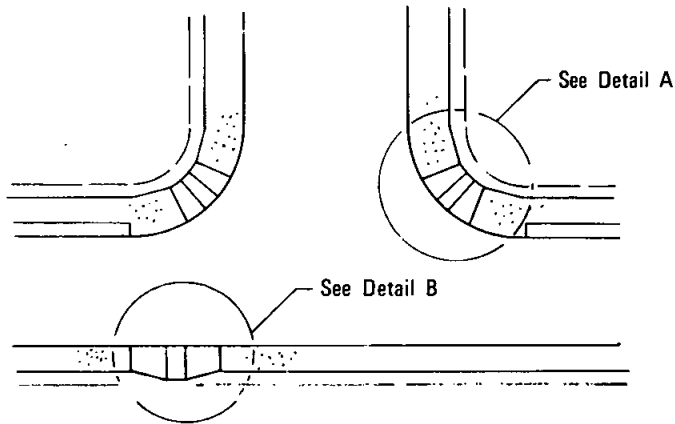
NOTES

- Concrete shall be 517 - C - 2500.
- See Standard Drawing G-10 for joint details.

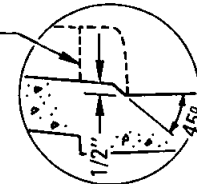
LEGEND ON PLANS



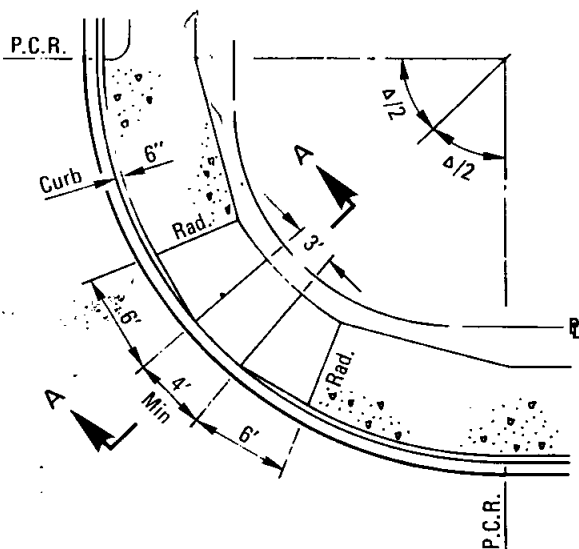
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
Thickness	SC	DS	7.79			Allard A. Kuehnert Dec. 1975	
				SIDEWALK - TYPICAL SECTIONS		Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER G-7	



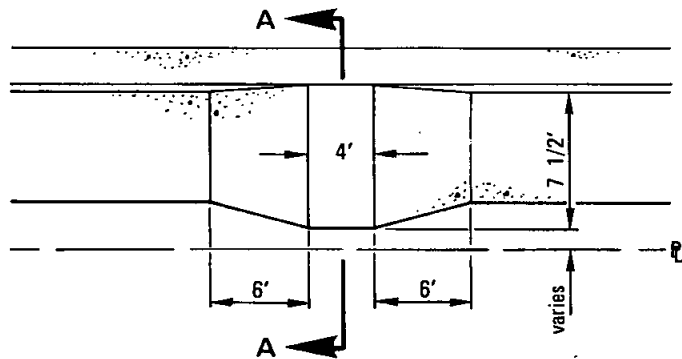
1/2" Lip on Depressed Curb
Section will be sloped at 45°



DETAIL C



DETAIL-A



DETAIL-B

NOTES

1. Ramp shall be centered on or directly opposite the bisector of the curb return or as directed by the Agency.
2. In the ramp area, the slope shall not exceed 12:1 (8.33%). Any deviation must be approved by the Agency.
3. Texture to be heavy broom finish transverse to axis of ramp.
4. Concrete shall be 517-C-2500.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

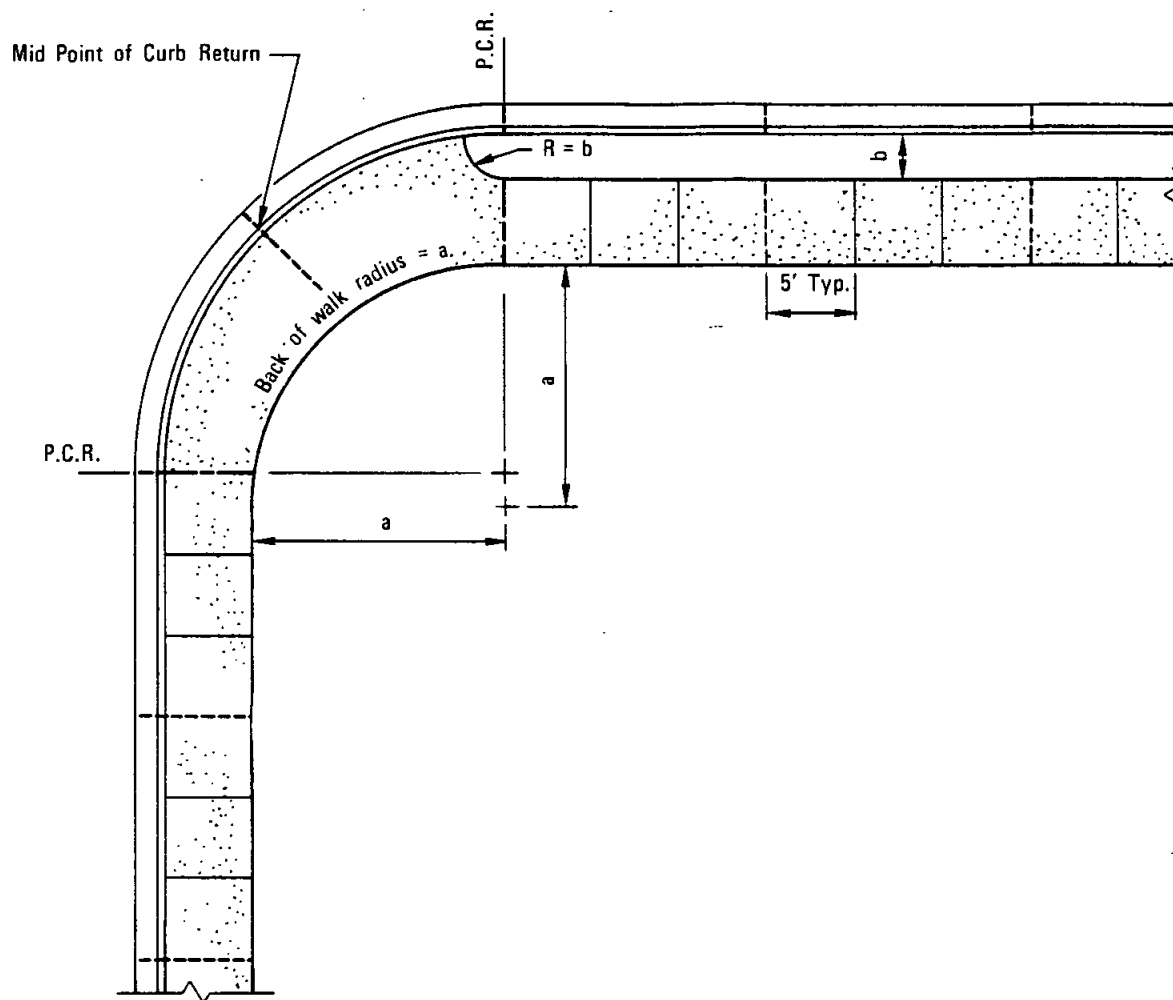
DRAWING
NUMBER

G-8

SAN DIEGO REGIONAL STANDARD DRAWING

SIDEWALK RAMP

Revision	By	Approved	Date
Sect A-A	je	D. S.	7-79



NOTES

1. Expansion Joints ——— at curb returns, and adjacent to structures.
(See Standard Drawing G-10).
2. Weakened Plane Joints - - - - - at mid point of curb return, when required,
and at 15' intervals from P.C.R.'s (See Standard Drawing G-10).
3. 1/4" grooves ——— with 1/4" radius edges at 5' intervals.
4. See Standard Drawing G-8 for installation of sidewalk ramps.

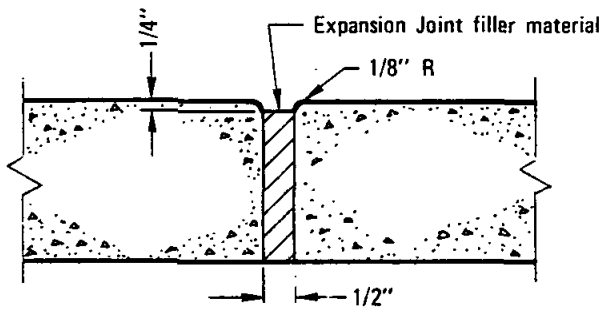
Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

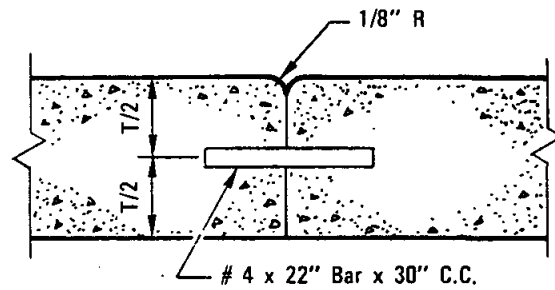
SIDEWALK JOINT LOCATIONS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allen A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

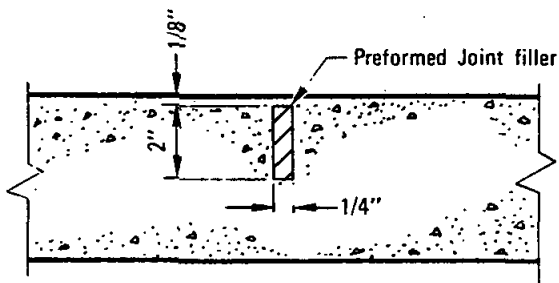
DRAWING
NUMBER **G-9**



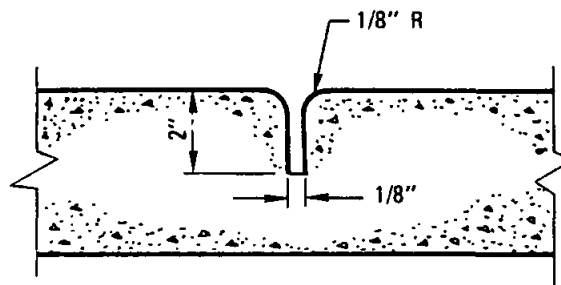
EXPANSION JOINT



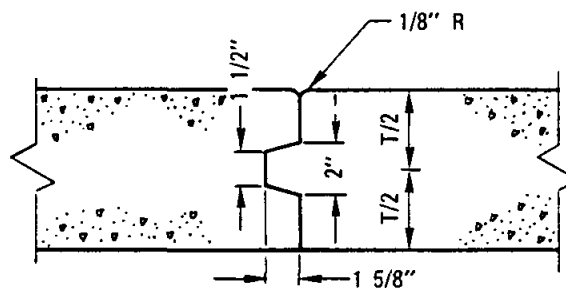
CONTACT JOINT



WEAKENED PLANE JOINT
PAVEMENT



WEAKENED PLANE JOINT
SIDEWALK



KEYED JOINT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen S. Kuehn Dec. 1975
Coordinator R.C.C. 19807 Date

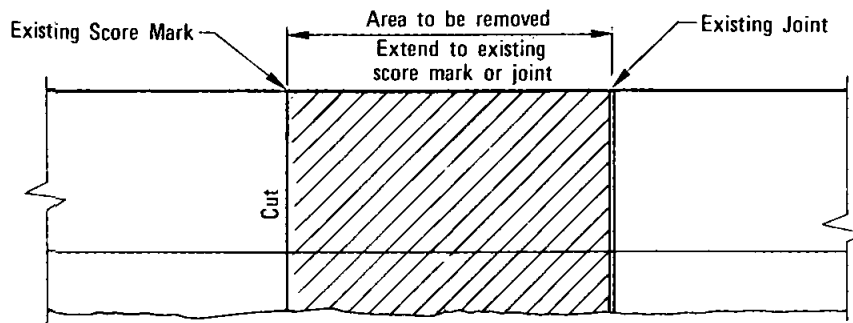
DRAWING
NUMBER

G-10

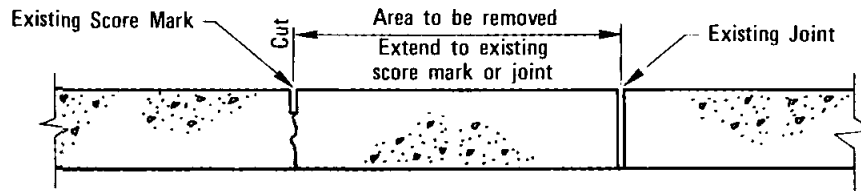
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE JOINT DETAILS

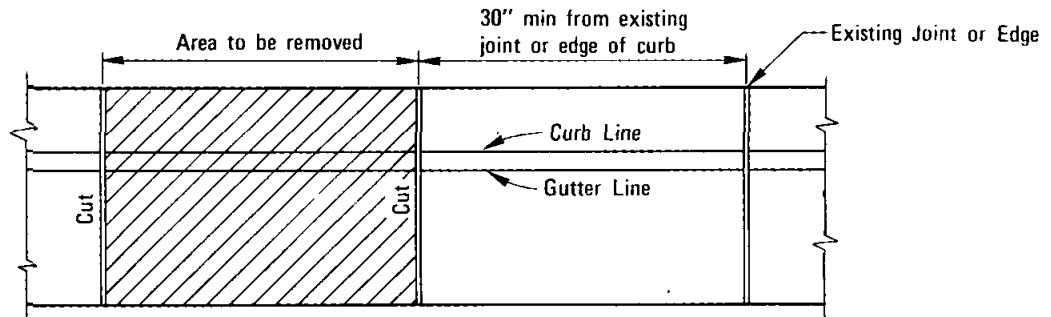
Revision	By	Approved	Date
Radius	SC	D. S.	7.79



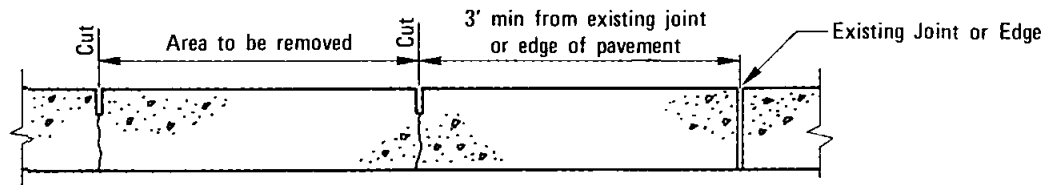
SIDEWALK PLAN



SIDEWALK SECTION

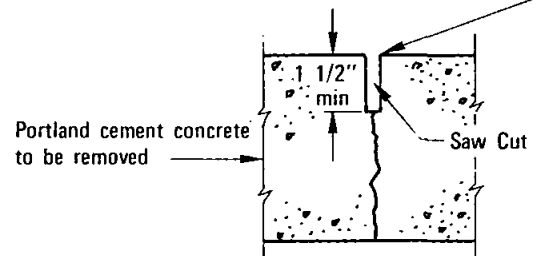


CURB PLAN



PAVEMENT SECTION

Remaining edge to be smooth and true with no shatter.

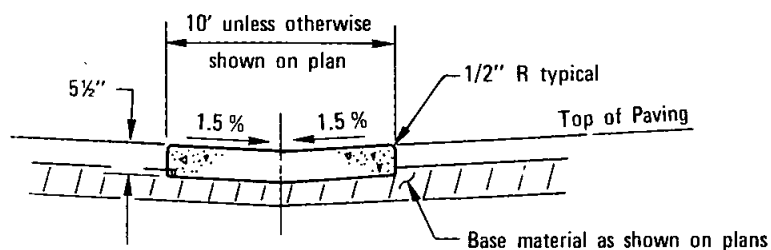
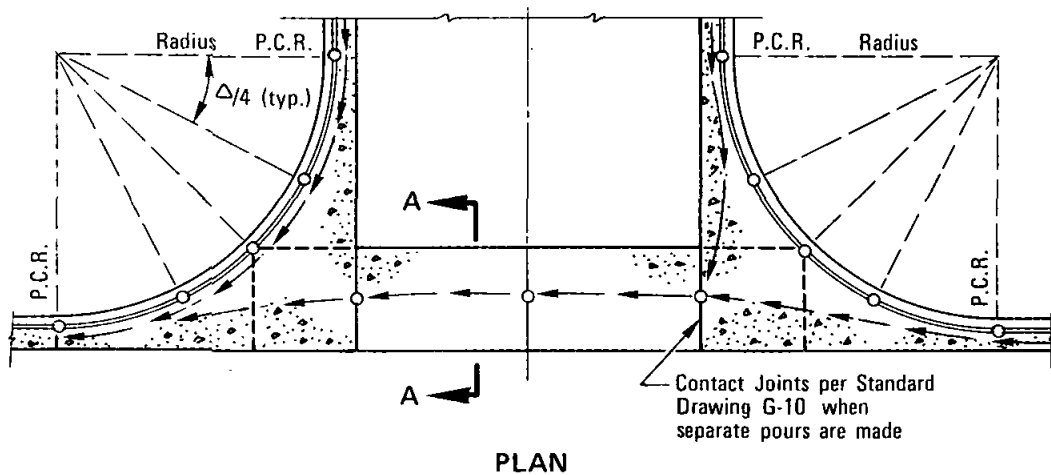


**SECTION
Showing Cut**

NOTE

When distance from, "Area to be removed", to existing joint, edge or score mark is less than minimum shown, "Area to be removed", shall be extended to that joint, edge or score mark.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				PORTLAND CEMENT CONCRETE CURB, GUTTER, SIDEWALK AND PAVEMENT REMOVAL AND REPLACEMENT		<i>Allard A. Kerschbaum</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER
						G-11



NOTES

1. Concrete shall be 517 - C - 2500.
2. ----- = Weakened plane joints.
3. ← ← = Typical flowlines.
4. ○ = Elevations to be shown on plans.
5. Return segments to be 5 1/2" thick.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

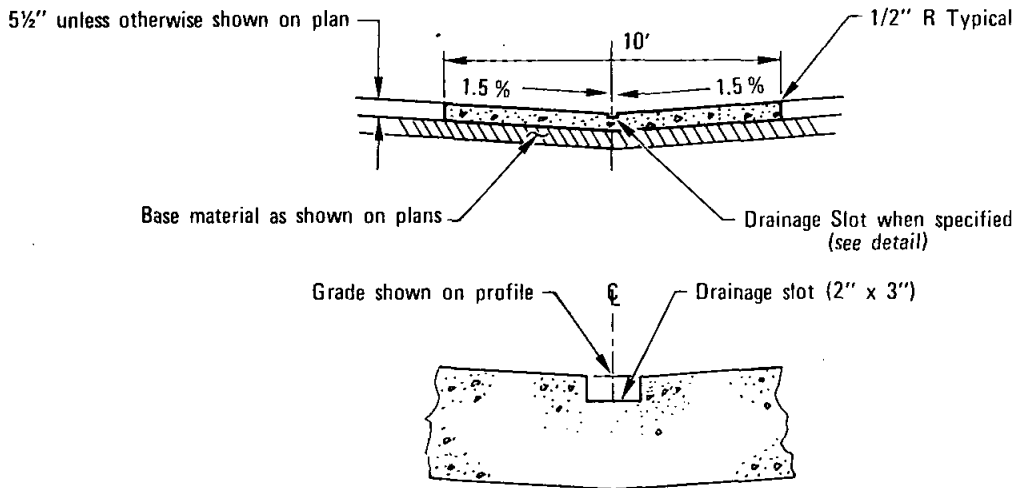
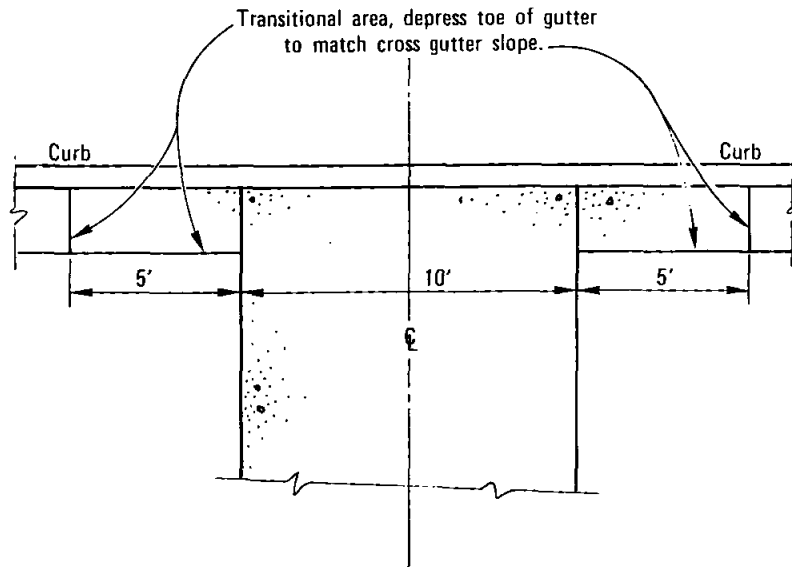
William A. Kuehn Dec. 1975
Coordinator H.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CROSS GUTTER

DRAWING
NUMBER **G-12**

Revision	By	Approved	Date
Thickness	3c	D.S.	7-79

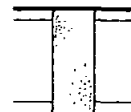


DRAINAGE SLOT DETAIL

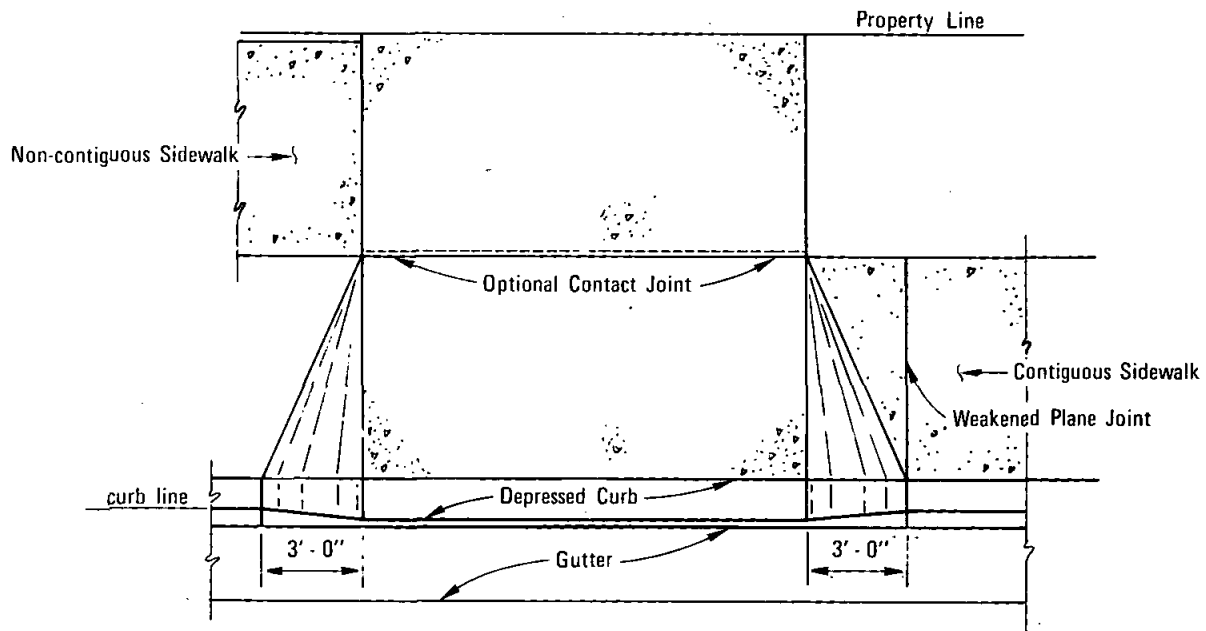
NOTES

1. Cross gutter to be constructed where the drainage is carried across street.
2. Minimum allowable cross slope is 0.5 %.
3. Concrete shall be 517 - C - 2500.

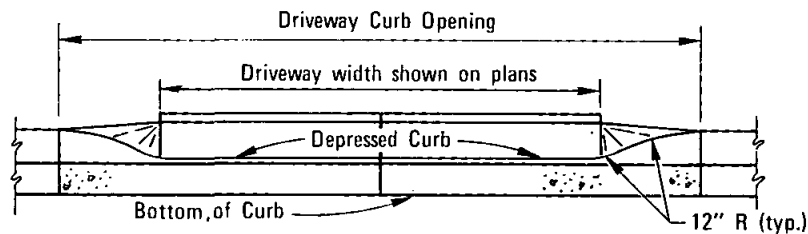
LEGEND ON PLANS



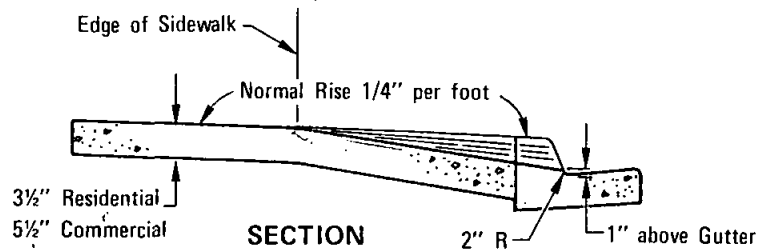
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Thickness	OS	OS	7-79		
				MID-BLOCK CROSS GUTTER	<i>Allan A. Kisch</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER G-13



PLAN



ELEVATION

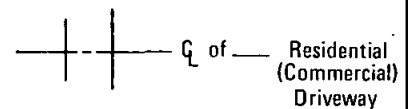


SECTION

NOTES

1. No concrete shall be placed until forms and subgrade are inspected by the Agency.
2. Concrete shall be 517-C-2500.
3. See standard drawings G-15 and G-16 for width and location requirements.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

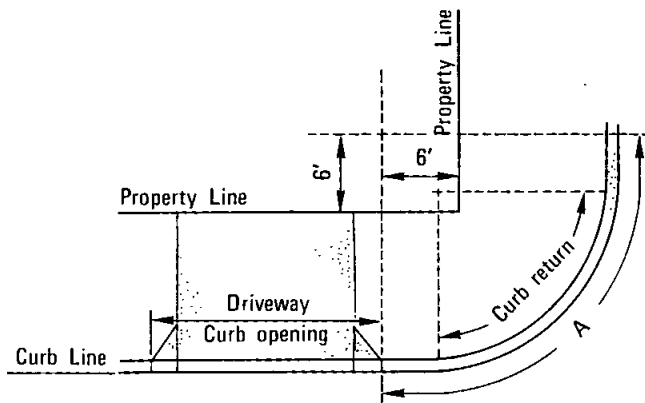
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-14**

SAN DIEGO REGIONAL STANDARD DRAWING

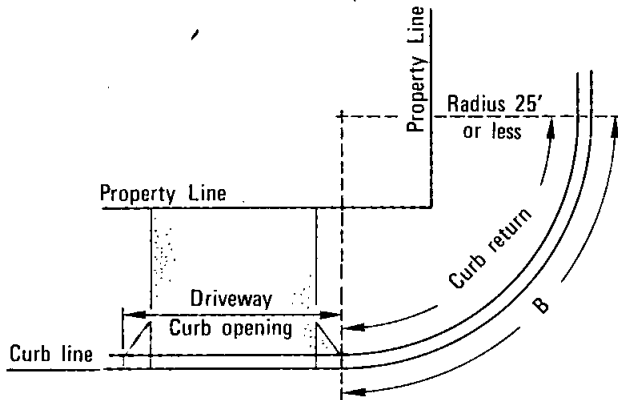
CONCRETE DRIVEWAYS

Revision	By	Approved	Date
Thickness	<i>30</i>	<i>D.S.</i>	<i>7-79</i>



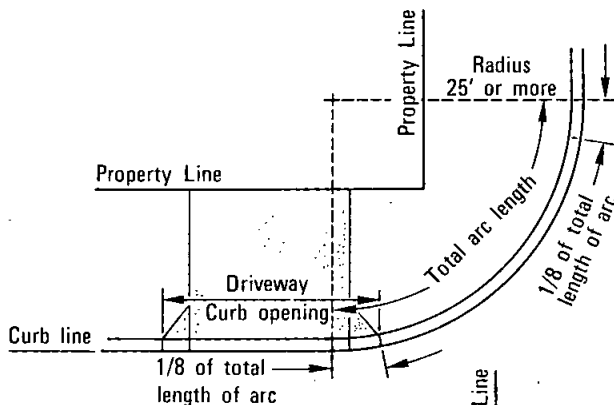
REQUIREMENT 1

No portion of any curb opening shall be permitted within 6' of the intersection of the prolonged property lines and the curb as shown by arc A.



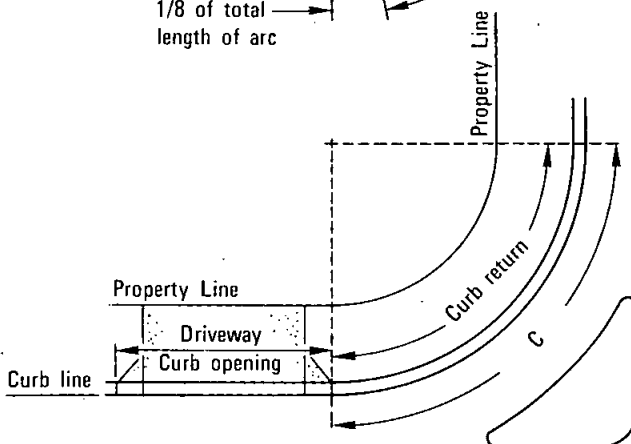
REQUIREMENT 2

No portion of any curb opening shall be permitted in the curb return where the radius of curb is 25' or less, as shown by arc B.



REQUIREMENT 3

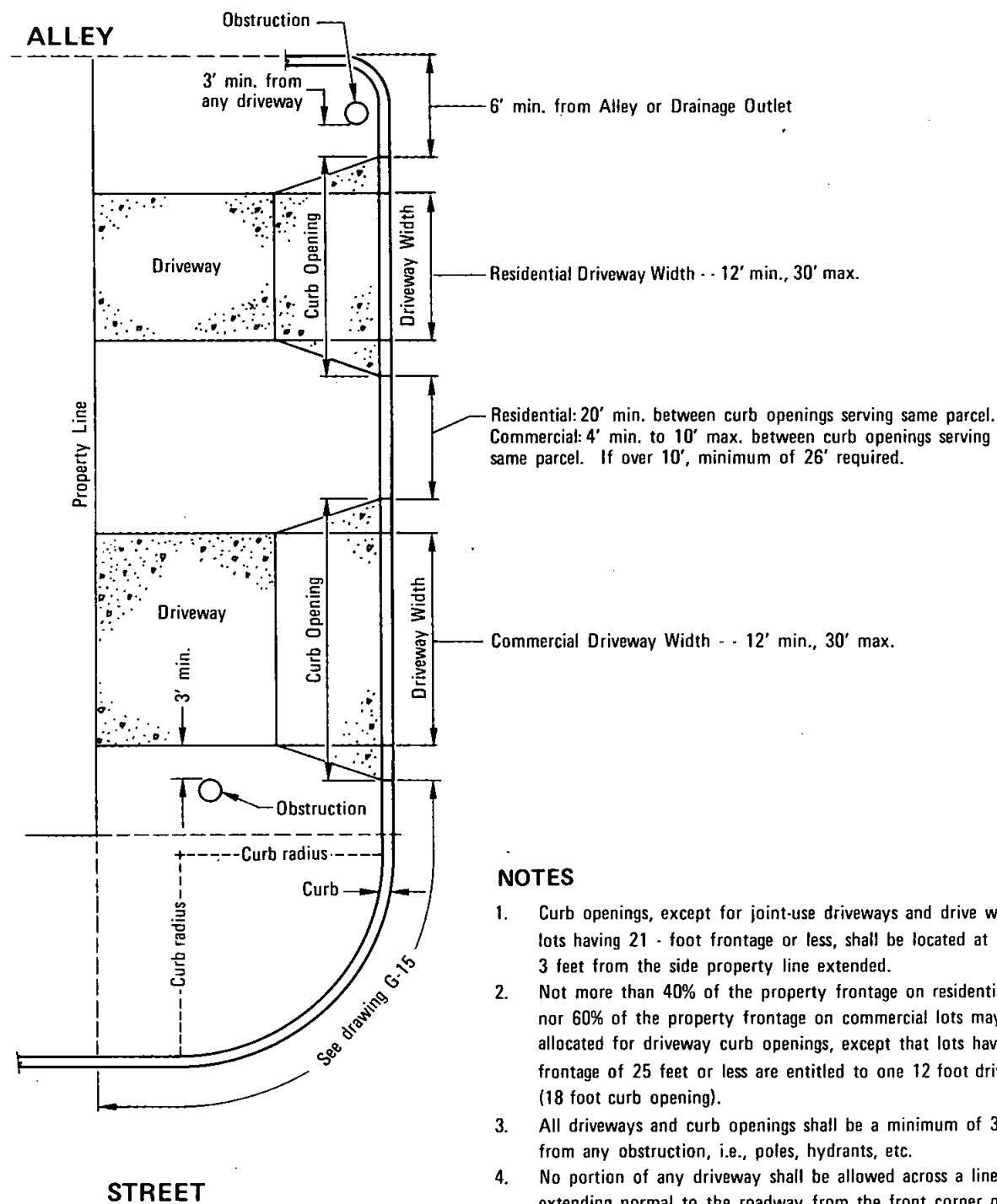
On all curb returns where the radius is 25' or more, curb openings may encroach upon each end of the return a distance equal to 12 1/2% or 1/8 of the total length of the arc on the curb return, thus leaving at least 75% of the length of arc on the return face free from driveway encroachment, provided Requirement 1 is met.



REQUIREMENT 4

No portion of any curb opening shall be permitted in the curb return where a separate turning movement is provided, as shown by arc C

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				DRIVEWAY LOCATION - ADJACENT TO CURB RETURNS AND STREET LINES		<i>Allan A. Kershner</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-15



NOTES

1. Curb openings, except for joint-use driveways and drive ways on lots having 21 - foot frontage or less, shall be located at least 3 feet from the side property line extended.
2. Not more than 40% of the property frontage on residential lots, nor 60% of the property frontage on commercial lots may be allocated for driveway curb openings, except that lots having frontage of 25 feet or less are entitled to one 12 foot driveway (18 foot curb opening).
3. All driveways and curb openings shall be a minimum of 3 feet from any obstruction, i.e., poles, hydrants, etc.
4. No portion of any driveway shall be allowed across a line extending normal to the roadway from the front corner of the property, except that joint-use driveways may be permitted in special instances where written approval of both property owners is filed with the Agency.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kersch *Dec. 1975*
Coordinator R.C.E. 19807 Date

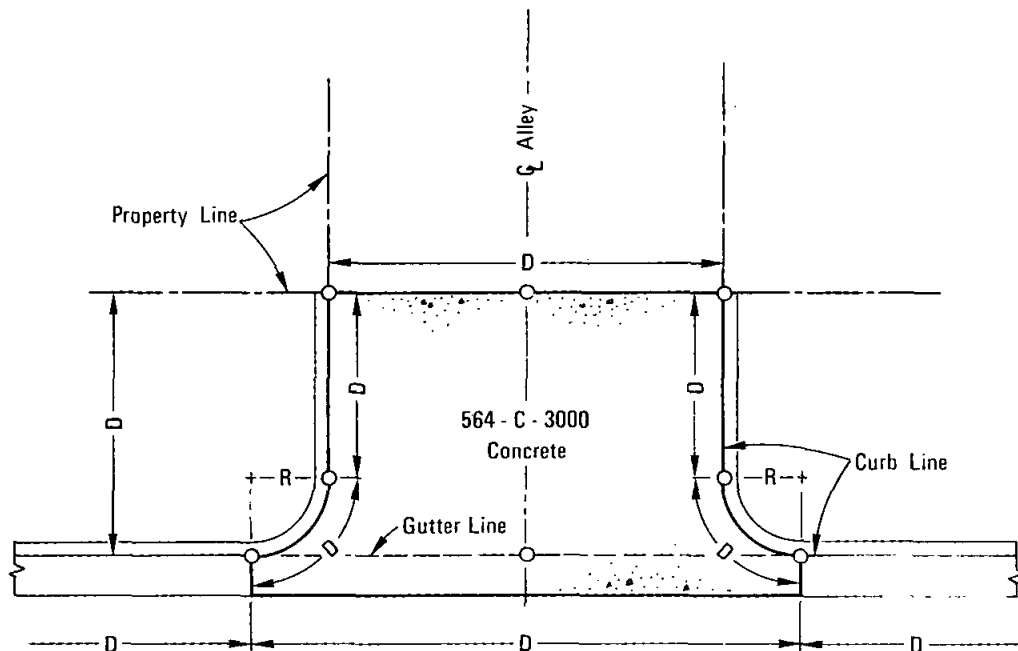
DRAWING
NUMBER

G-16

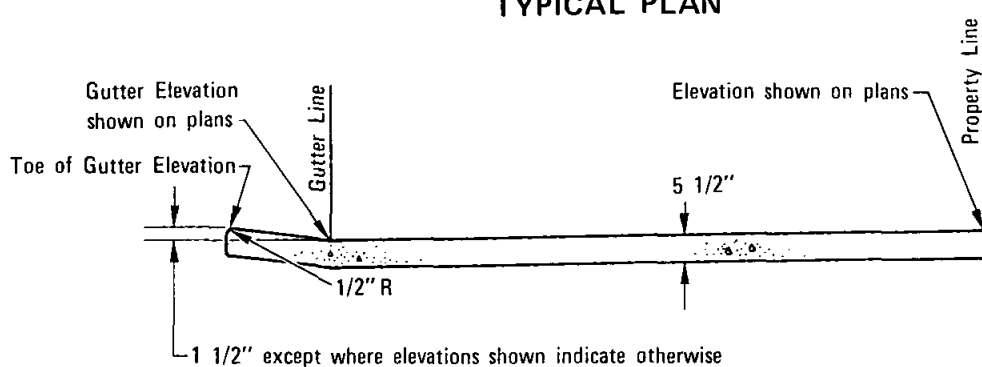
SAN DIEGO REGIONAL STANDARD DRAWING

DRIVEWAY LOCATION AND WIDTH REQUIREMENTS

Revision	By	Approved	Date



TYPICAL PLAN



Q SECTION

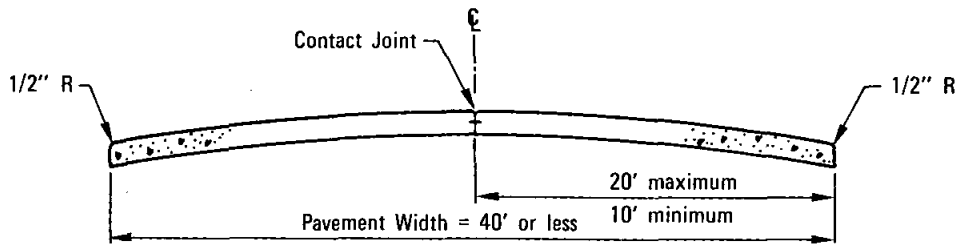
NOTES

1. Sidewalk Ramps shall be installed as required by Agency.
2. D = distance shown on plans.
3. R = radius shown on plans (3 ft. minimum).
4. O = elevations shown on plans (top of curb, and gutter elev.).

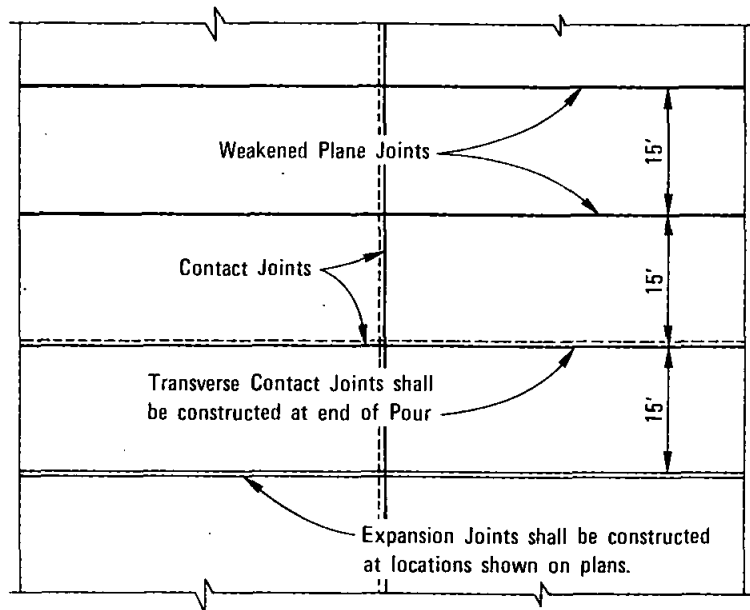
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
Thickness	IC	D.S.	7.79			<i>Allen A. Kuehn</i>	<i>Dec. 1975</i>
				ALLEY APRON		Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	G-17



TYPICAL SECTION



TYPICAL PLAN

NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

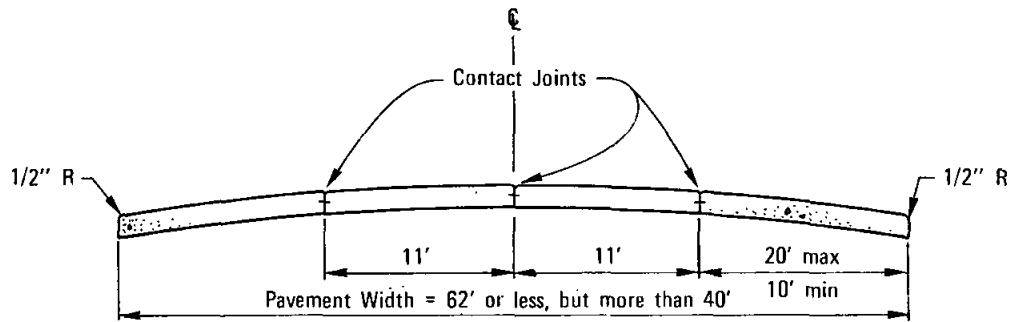
DRAWING
NUMBER

G-18

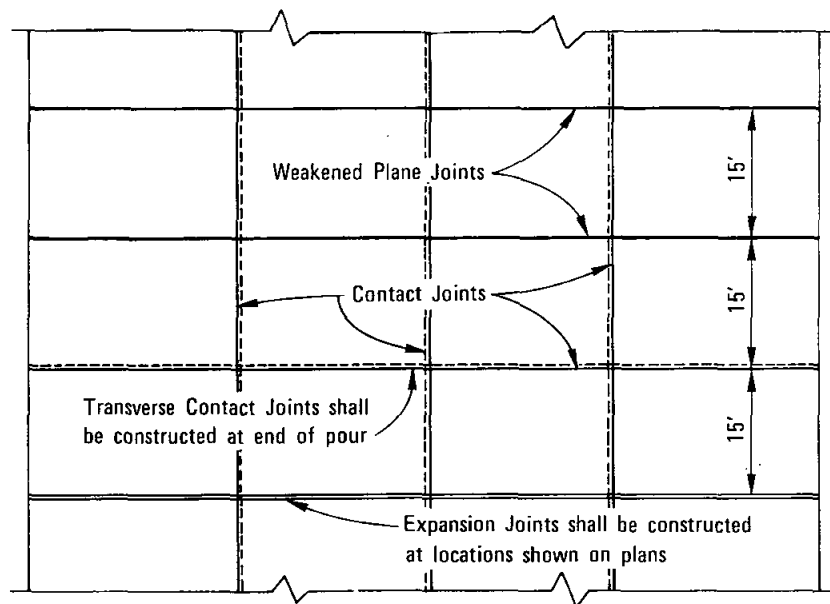
SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE PAVEMENT,
WIDTH 40' OR LESS**

Revision	By	Approved	Date



TYPICAL SECTION

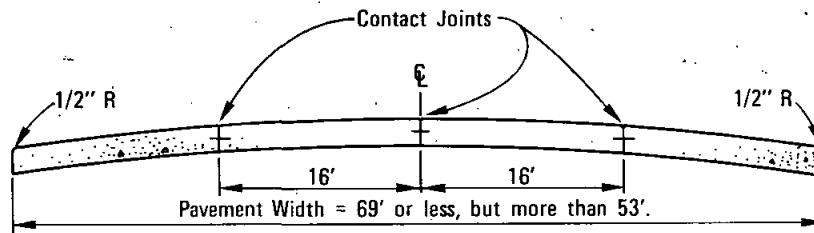


TYPICAL PLAN

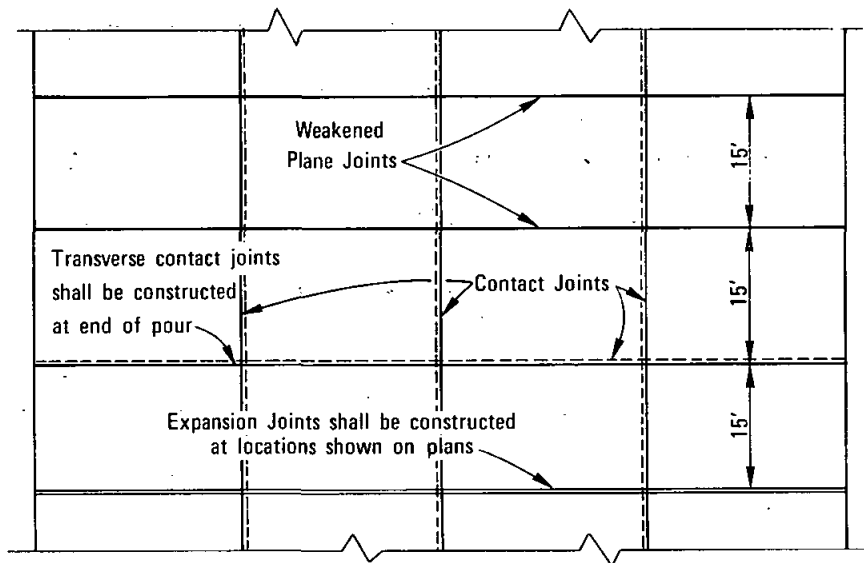
NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for joint details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE PAVEMENT, WIDTH 40' TO 62'		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-19



TYPICAL SECTION



TYPICAL PLAN

NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for Joint Details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

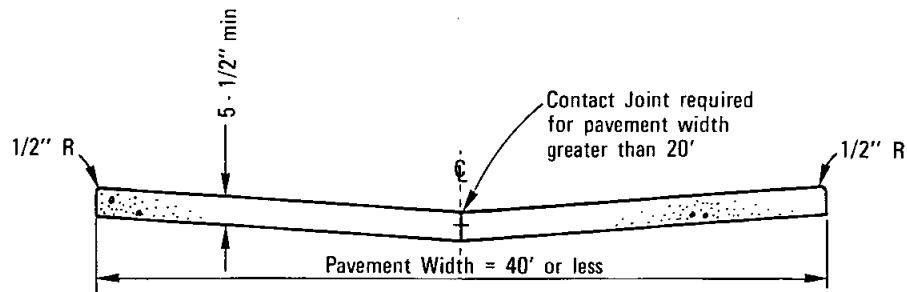
SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE PAVEMENT,
WIDTH 53' TO 69'**

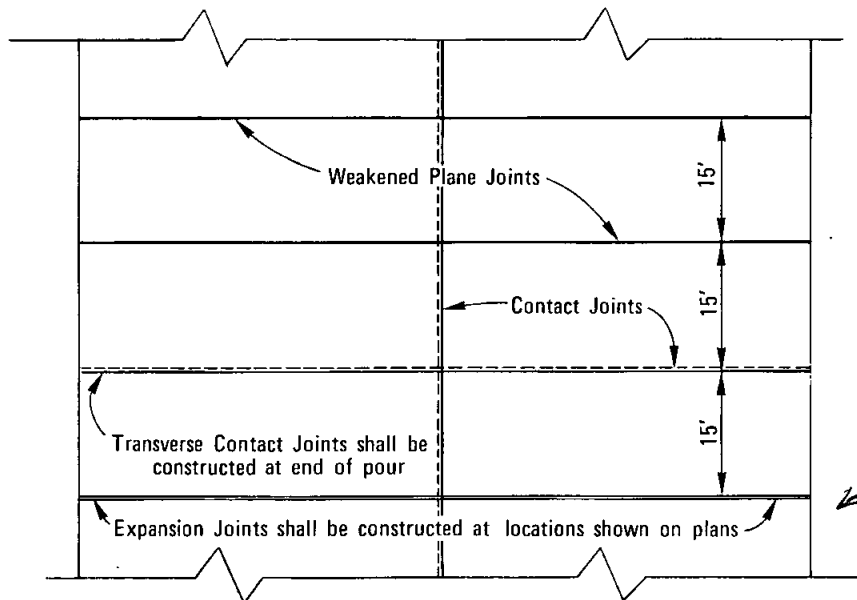
**DRAWING
NUMBER**

G-20

Revision	By	Approved	Date



TYPICAL SECTION

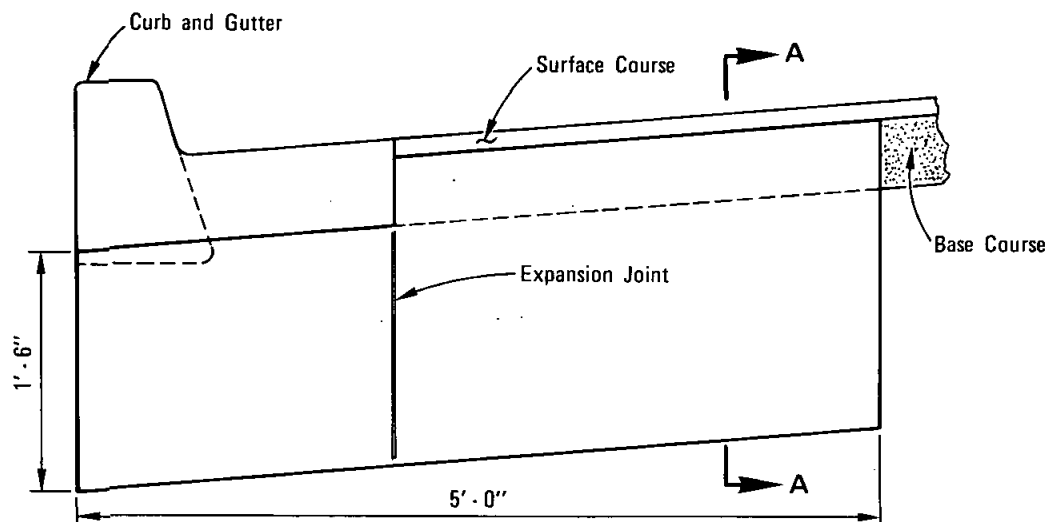


TYPICAL PLAN

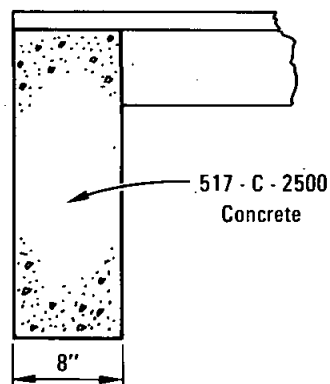
NOTES

1. Concrete shall be 564 - C - 3000.
2. See Standard Drawing G-10 for joint details.
3. Adjust 15' interval between Transverse Joints to match adjacent existing improvements.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE PAVEMENT, ALLEY SECTION, WIDTH 40' OR LESS		<i>Allen A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-21

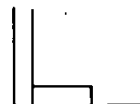


ELEVATION



SECTION A-A

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kersch *Dec. 1975*
Coordinator R.C.E. 19807 Date

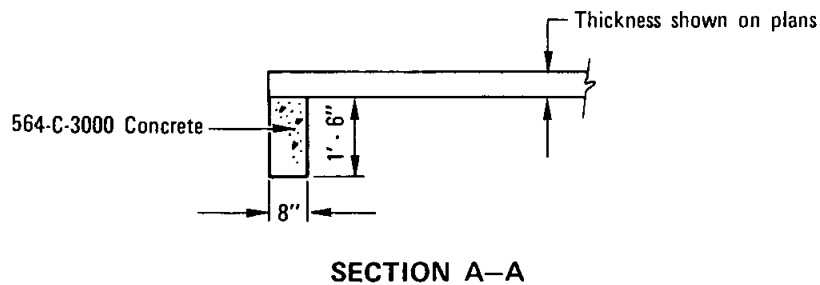
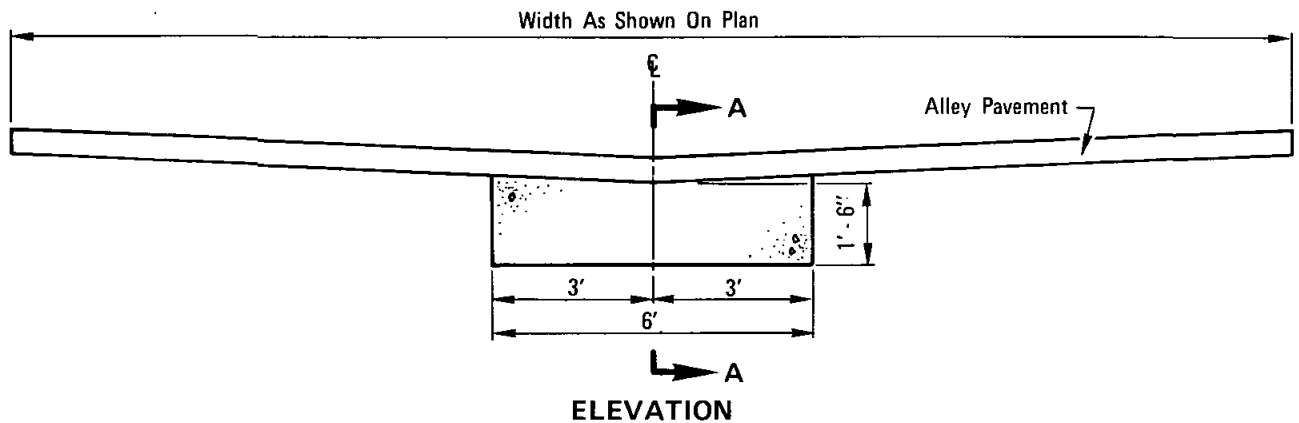
DRAWING
NUMBER

G-22

SAN DIEGO REGIONAL STANDARD DRAWING

CUTOFF WALL AT END
OF PAVEMENT

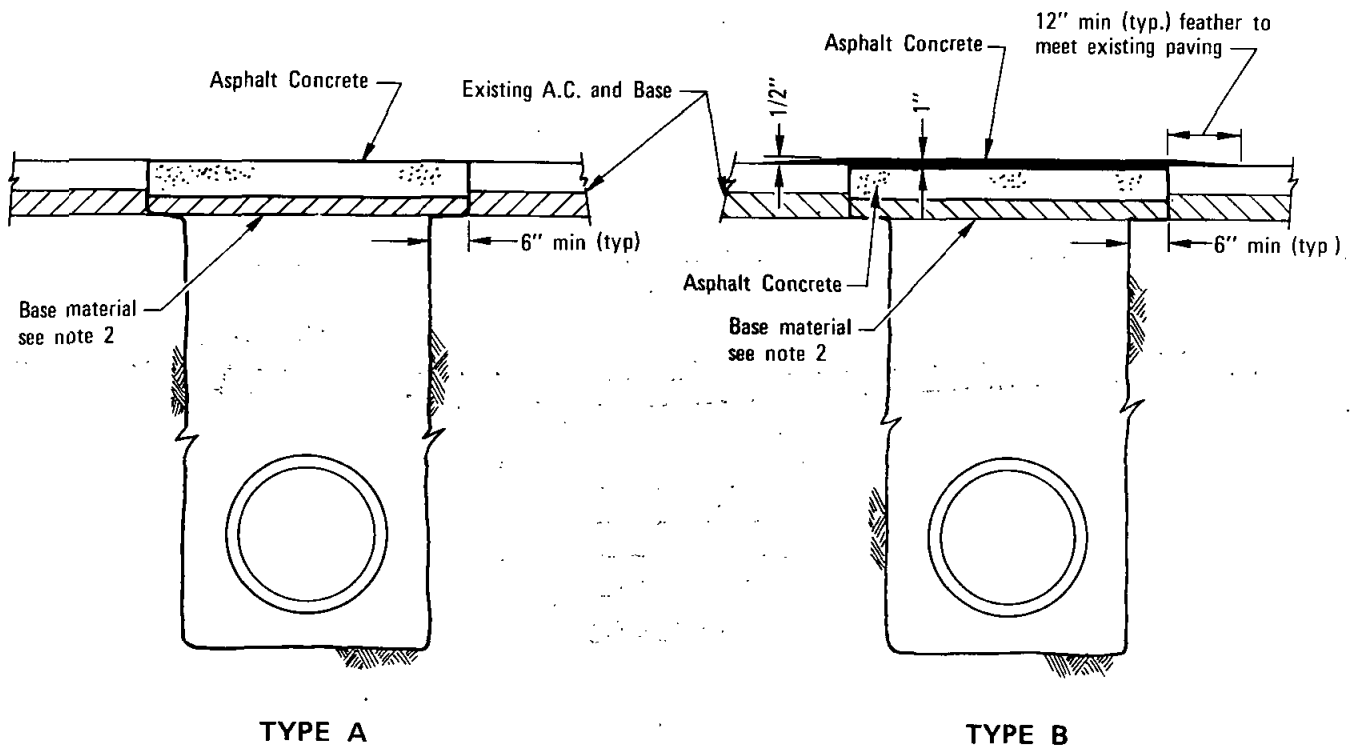
Revision	By	Approved	Date



LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CUTOFF WALL AT END OF ALLEY PAVEMENT		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	G-23



NOTES

1. Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.
2. Base material to be replaced to depth of existing base. A.C. may be substituted for base material.
3. A tack coat of asphaltic emulsion or paving asphalt shall be applied to existing A.C. at all contact surfaces, prior to resurfacing.
4. Asphaltic Concrete Resurfacing:
 - a) Minimum total thickness shall be one inch greater than existing A.C.
 - b) A.C. shall be hot plant mix.
 - c) Finish course for Type B resurfacing shall be laid down using a spreader box.
5. All A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.
6. Type B not to be used on lateral crossings.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

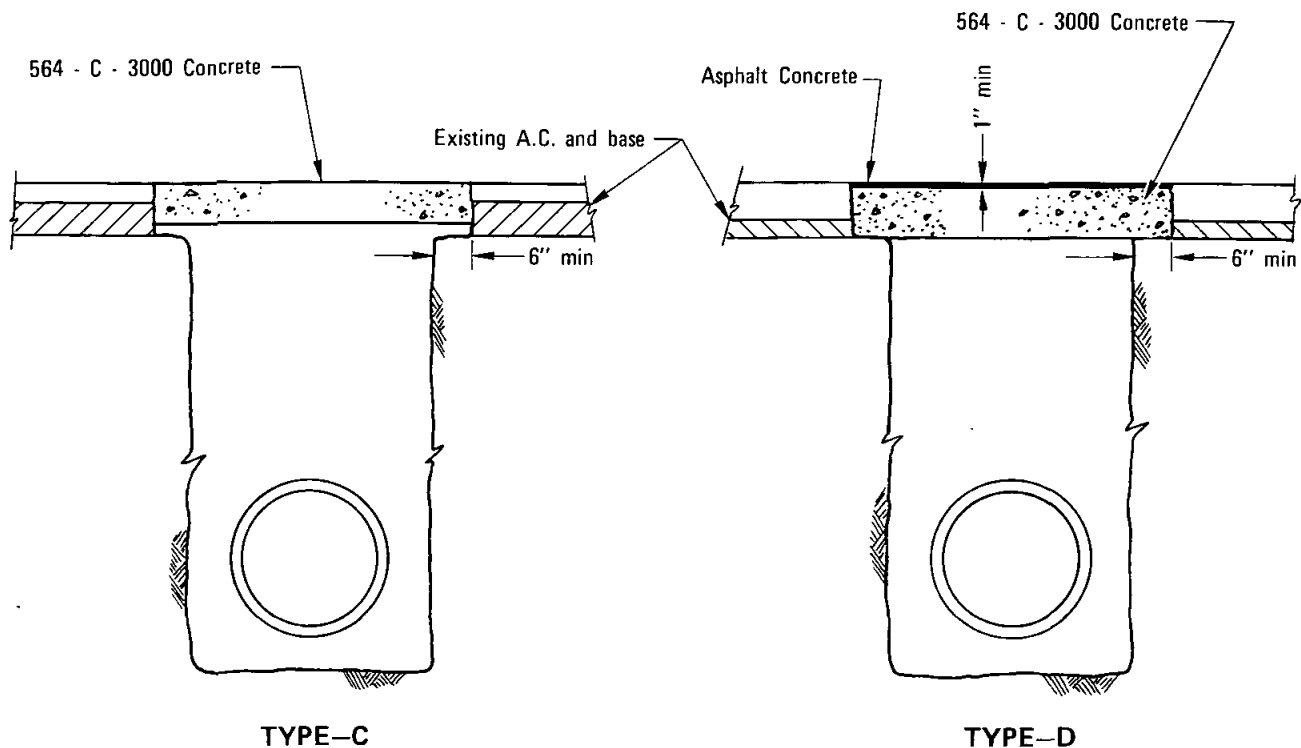
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **G-24**

SAN DIEGO REGIONAL STANDARD DRAWING

TRENCH RESURFACING TYPES A & B

Revision	By	Approved	Date



GENERAL NOTES

- Existing A.C. shall be cut and removed in such a manner so as not to tear, bulge or displace adjacent pavement. Edges shall be clean and vertical. All cuts shall be parallel or perpendicular to street centerline, when practical.

NOTES TYPE-C

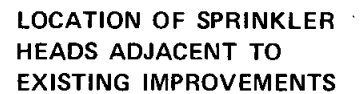
- Concrete shall be colored black. Method to be specified by Agency.
- Minimum concrete thickness:
 - Alleys and local residential streets 5 inches
 - Major streets and highways 7 inches

NOTES TYPE-D

- A.C. shall be hot plant mix.
- A tack coat of asphaltic emulsion or paving asphalt shall be applied to the existing A.C. at all contact surfaces and to the portland concrete prior to placing the new A.C.
- A.C. resurfacing shall be seal coated with an emulsified asphalt and covered with sand. Chip sealing shall be applied as required by Agency.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allan A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
				TRENCH RESURFACING TYPES C & D	DRAWING NUMBER G-25

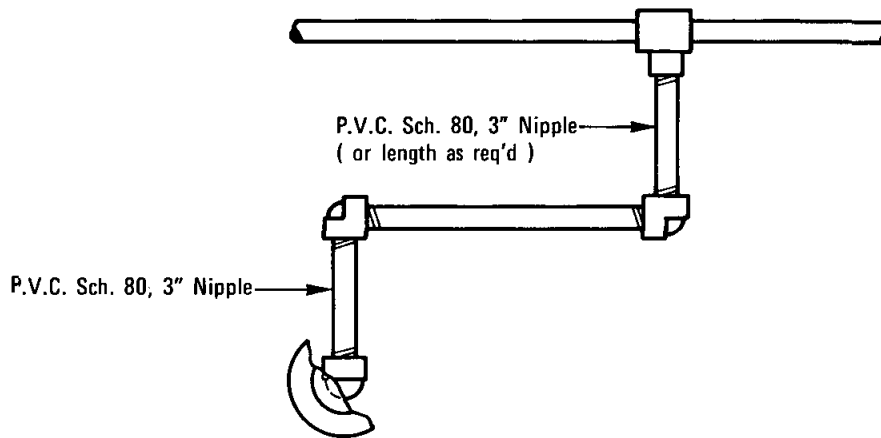
SPRINKLER IRRIGATION SYSTEMS



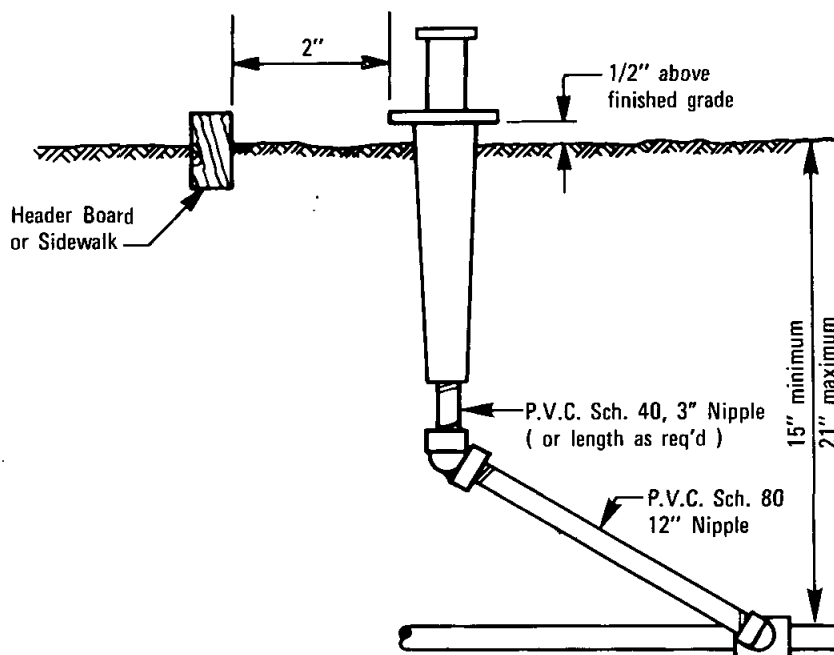
- LEGEND ON PLANS

Show a number to indicate type head.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				SHRUBBERY SPRINKLER HEAD FIXED SPRAY TYPE		<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
						DRAWING NUMBER I-1



PLAN




ELEVATION

NOTES

1. All fittings shall be P.V.C. Sch. 40.
2. Teflon tape, 3/4" wide, shall be used on all threaded connections.
3. Short nipples shall not be used.

LEGEND ON PLANS

Show a number to indicate type head 

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kuehnel *Dec. 1975*
Coordinator R.C.E. 19807 Date

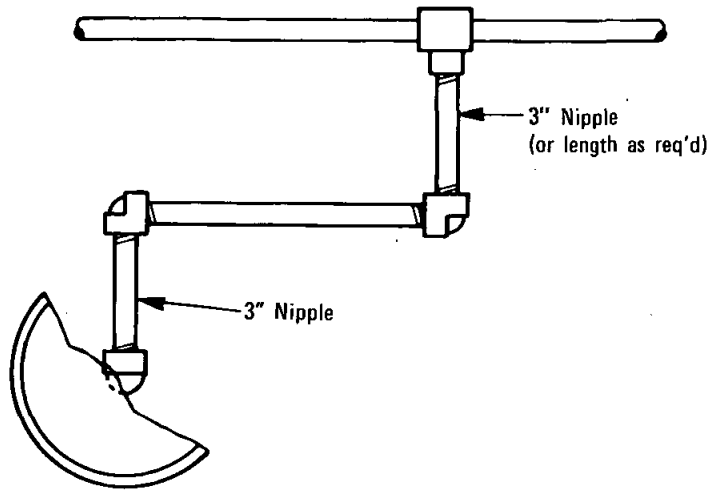
DRAWING
NUMBER

I-2

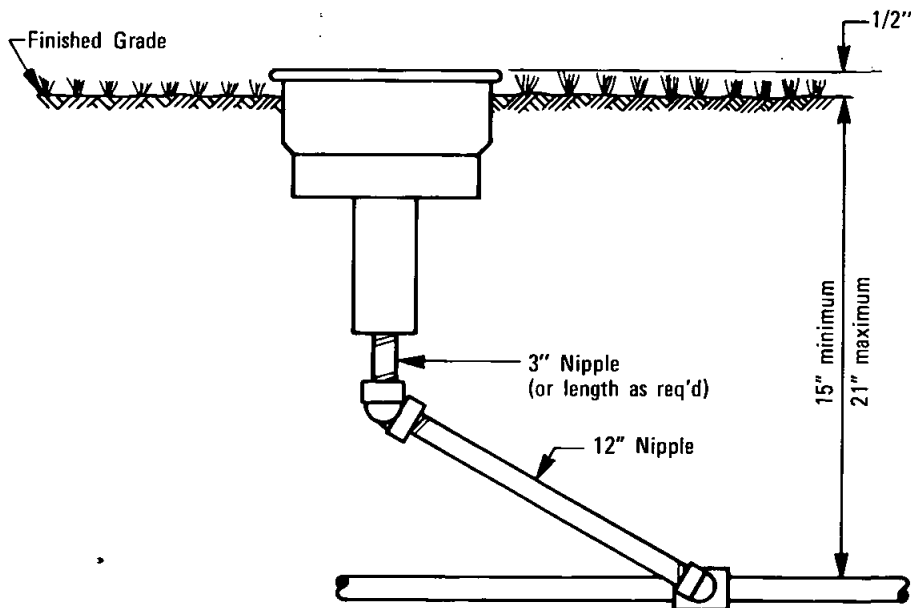
SAN DIEGO REGIONAL STANDARD DRAWING

**LAWN SPRINKLER HEAD
POP UP SPRAY TYPE**

Revision	By	Approved	Date



PLAN




ELEVATION

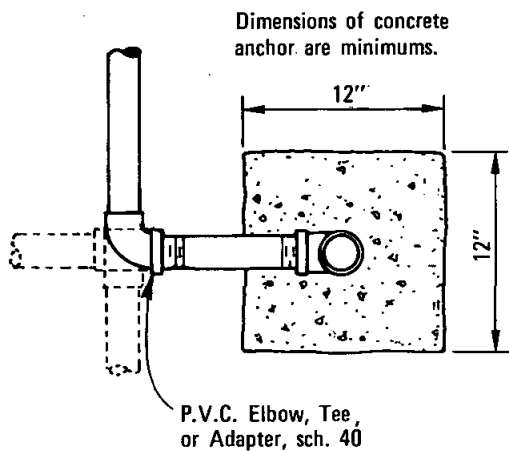
NOTES

1. All fittings shall be P.V.C. Sch. 40.
2. All nipples shall be P.V.C. Sch. 80.
3. Teflon tape, 3/4" wide, shall be used on all threaded connections.
4. Short nipples shall not be used.

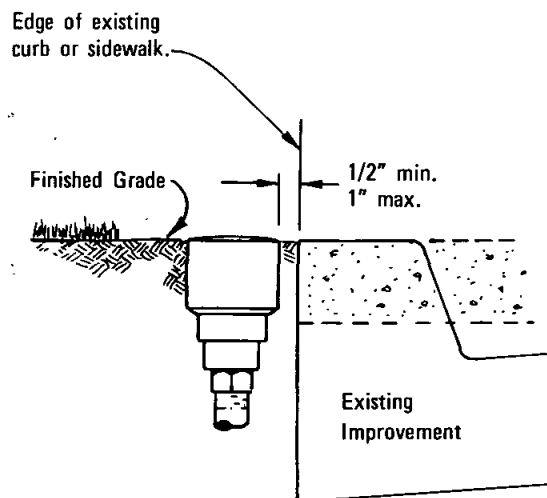
LEGEND ON PLANS

Show a number to indicate type head 

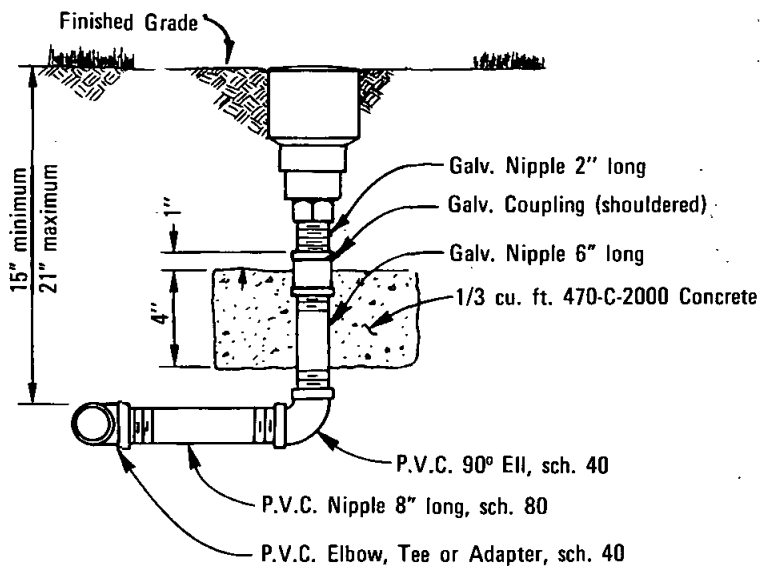
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				LAWN SPRINKLER HEAD POP UP ROTARY (WITH SWING JOINT)		<i>Allen A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	I-3



PLAN



LOCATION OF SPRINKLER HEADS ADJACENT TO EXISTING IMPROVEMENTS



ELEVATION

NOTES

1. Teflon tape, 3/4" wide, shall be used on all threaded connections.
2. Close nipples shall not be used.

LEGEND ON PLANS

Show a number to indicate type head

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

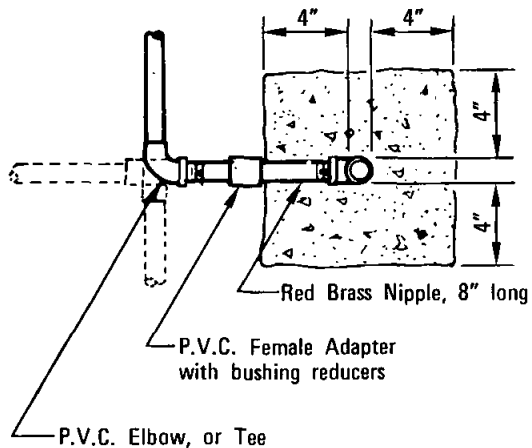
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER 1-4

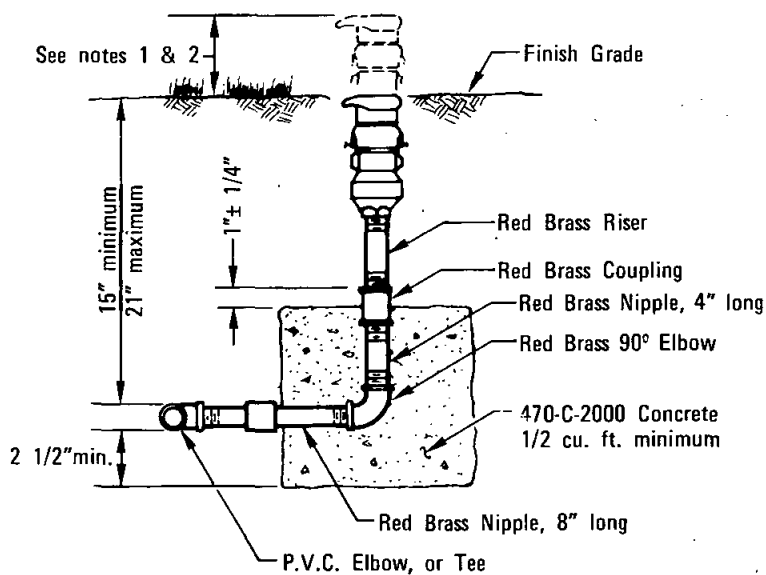
SAN DIEGO REGIONAL STANDARD DRAWING

LAWN SPRINKLER HEAD POP UP ROTARY (WITH ANCHOR BLOCK)

Revision	By	Approved	Date



PLAN

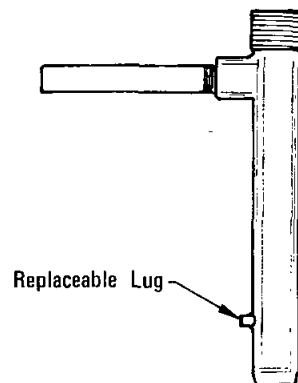


ELEVATION

NOTES

1. Quick coupling valves in lawn areas shall be set to grade.
2. Quick coupling valves in shrub areas shall be set 4 inches above grade.
3. Dimensions of concrete anchors are minimums.
4. Close nipples shall not be used.

COUPLER KEY-SINGLE LUG



KEY FOR LOCK TOP

LEGEND ON PLANS

Q.C.V.

Revision	By	Approved	Date

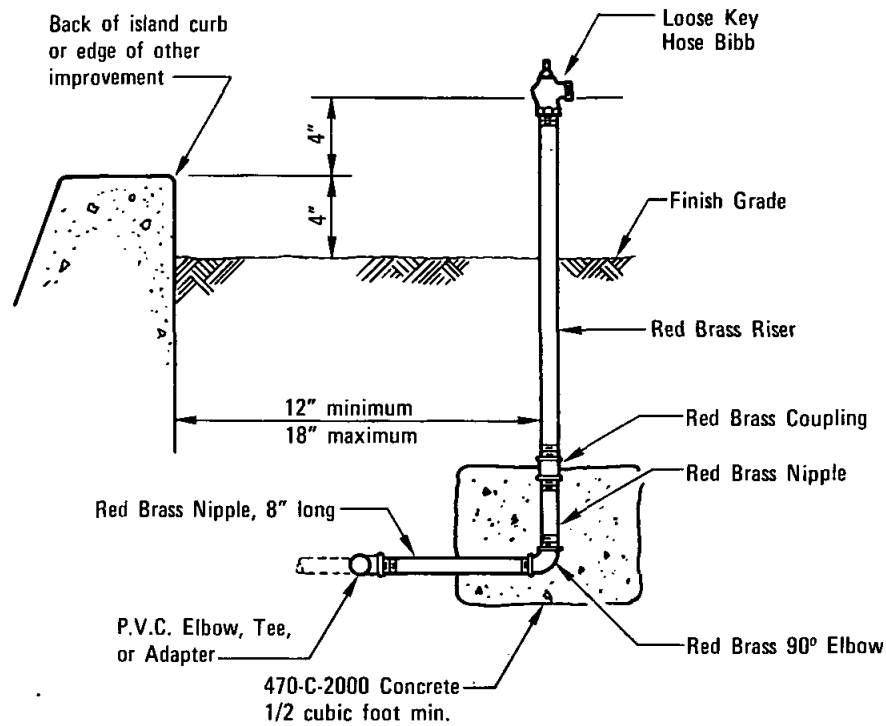
SAN DIEGO REGIONAL STANDARD DRAWING

QUICK COUPLING VALVE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING NUMBER **I-5**



NOTES

- Hose bibb shall be loose key operated, all brass or bronze construction, angle pattern with removable bonnet and stem assembly, replaceable seat washers and stem packing glands.
- Unless otherwise specified, the hose connection thread shall be 3/4" male hose thread (pacific coast), and the riser opening thread shall be 3/4" female I.P.S. Discharge opening shall be 90° to riser opening.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

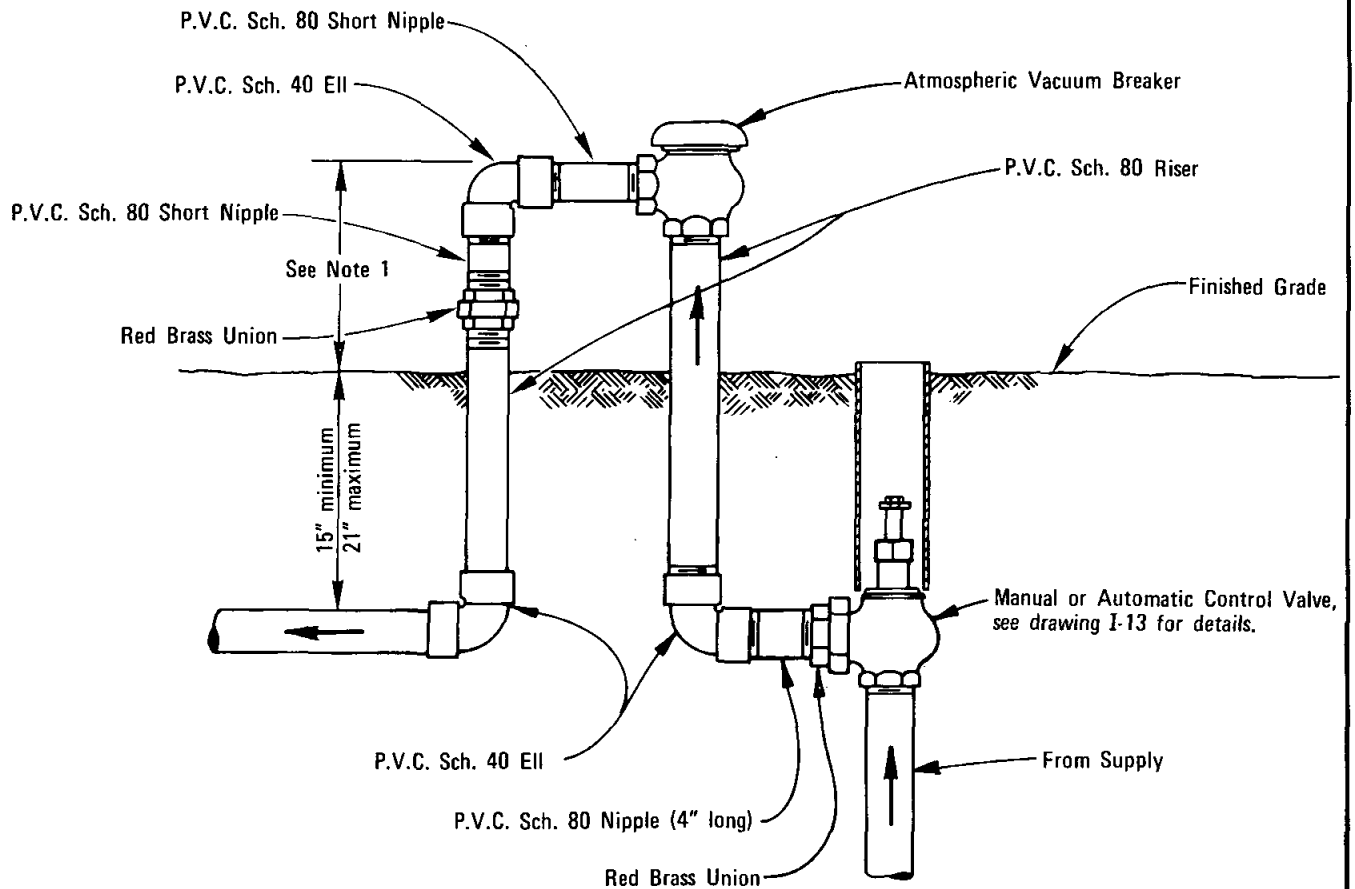
DRAWING
NUMBER

I-6

SAN DIEGO REGIONAL STANDARD DRAWING

**HOSE BIBB
(GARDEN VALVE)**

Revision	By	Approved	Date



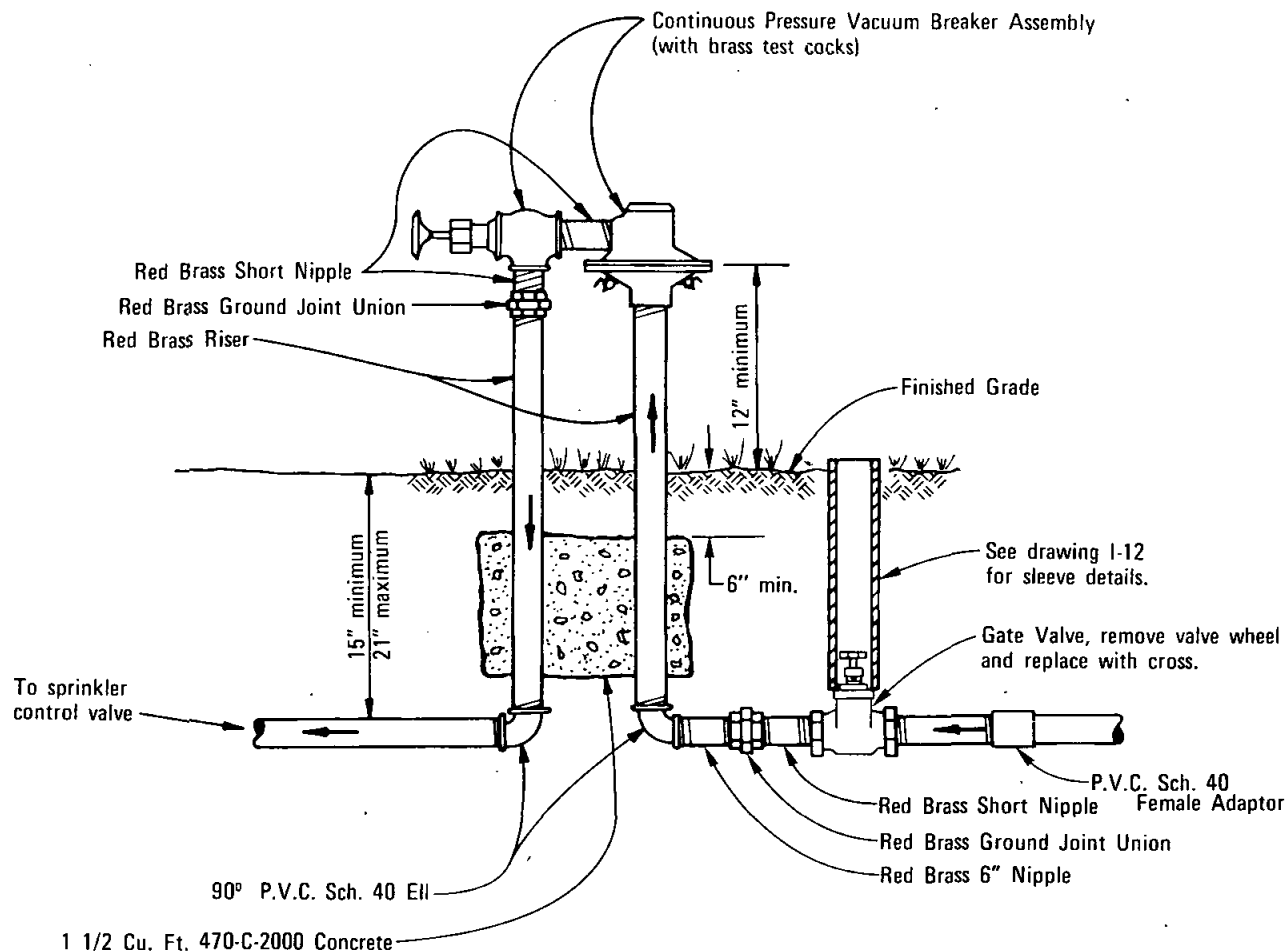
NOTES

1. Atmospheric vacuum breakers shall be installed approximately 6" above the finished grade and above a sufficient number of sprinkler heads closest to the vacuum breaker so that at no time will it be subjected to back pressure or drainage.
2. Close nipples shall not be used.
3. All fittings, including the atmospheric vacuum breaker, shall not be of smaller size than the valve.
4. Teflon tape, 3/4" wide, shall be used on all threaded connections.
5. For use on lines 2 inches and smaller.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Alfred A. Kerschbaum</i>	<i>Dec. 1975</i>
				ATMOSPHERIC VACUUM BREAKER (2" AND SMALLER)		Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	I-7



NOTES

1. Continuous pressure vacuum breakers shall be installed approximately 12 inches above finished grade and at the highest point in the line.
2. Continuous pressure vacuum breakers shall not be subjected to back pressure or drainage.
3. Teflon tape 3/4" wide shall be used on all threaded connections.
4. Close nipples shall not be used.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Robert J. [Signature] Dec. 1975
Checked by: H.F.E. 10/907 Date

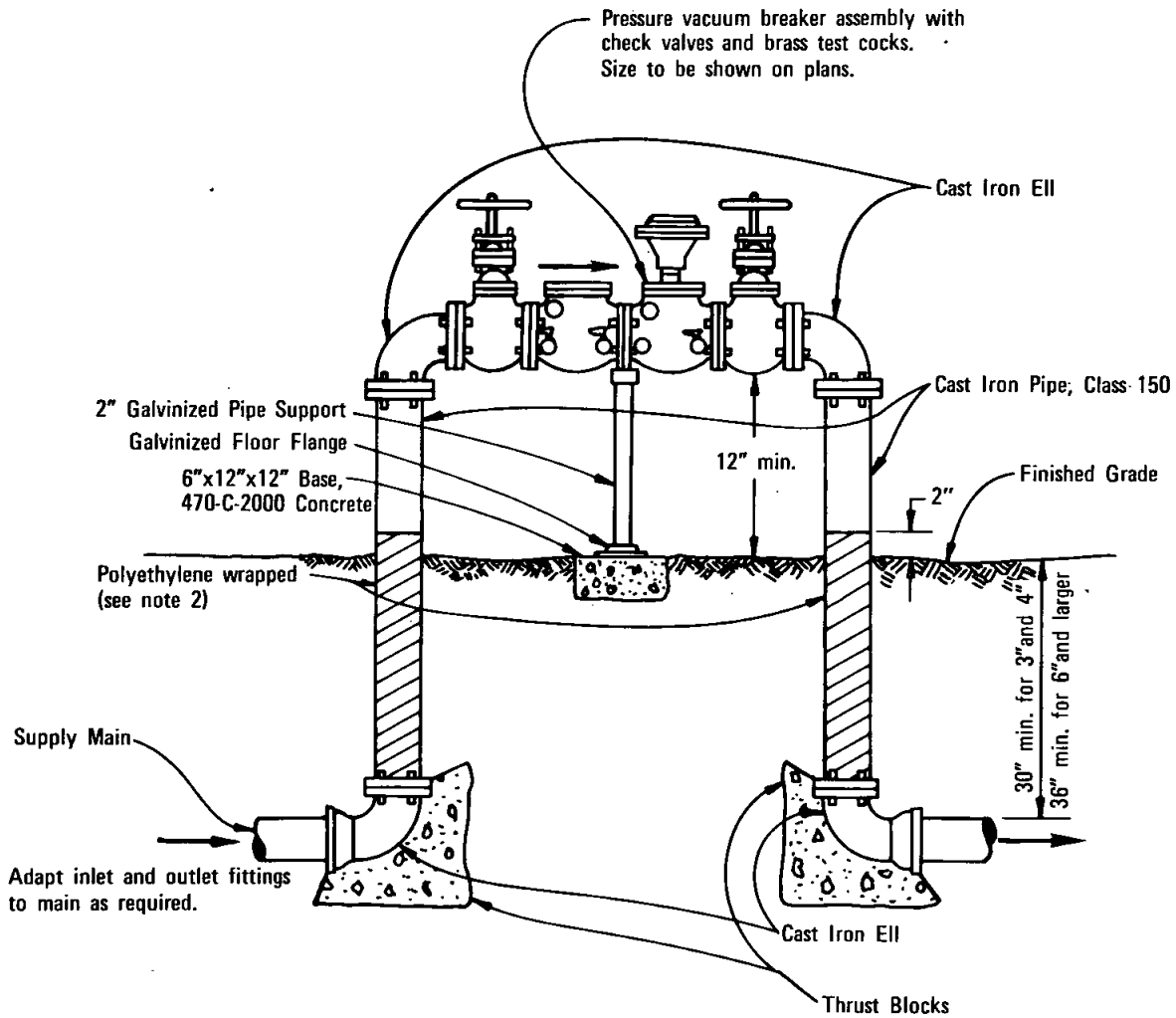
DRAWING
NUMBER

I-8

SAN DIEGO REGIONAL STANDARD DRAWING

CONTINUOUS PRESSURE VACUUM BREAKER ASSEMBLY (2" AND SMALLER)

Revision	By	Approved	Date
Note 1	<i>[Signature]</i>	D.S.	7-79



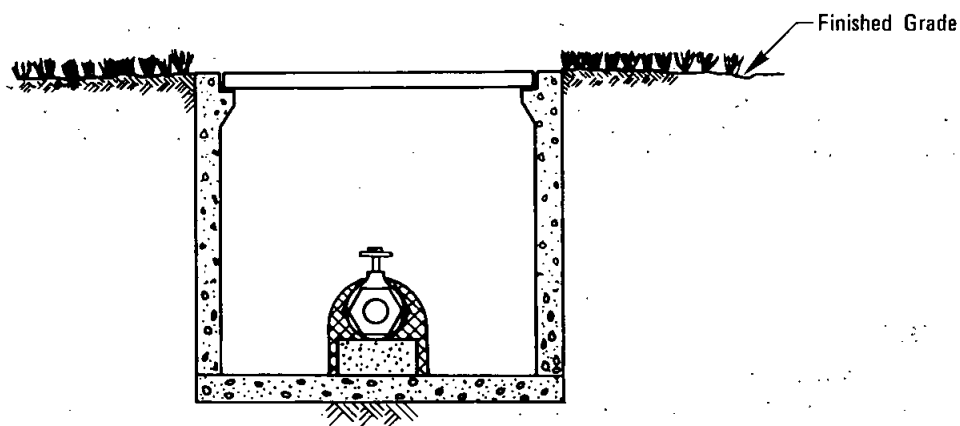
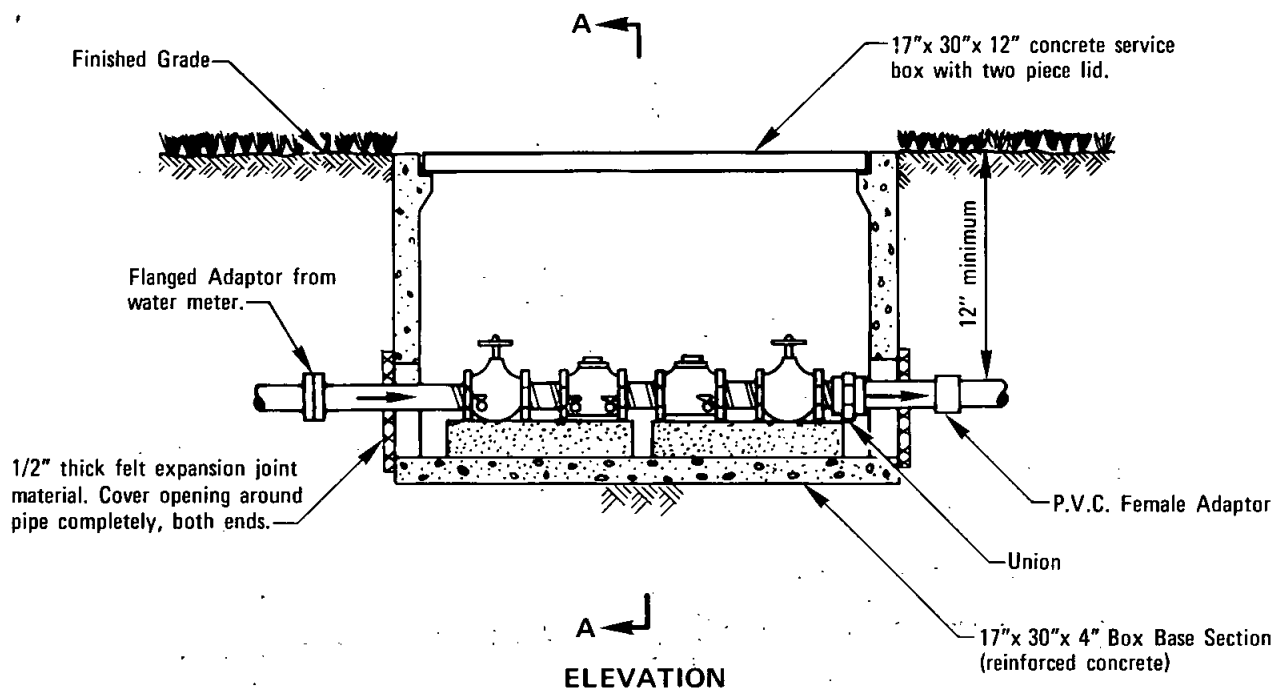
NOTES

1. All fittings on assembly shall be flanged.
2. Cast iron pipe shall be polyethylene wrapped with a 2" wide plastic backed adhesive tape. Use 1/2" overlap.
3. Cast iron pipe and fittings shall be cement mortar lined.
4. Pressure vacuum breaker assembly shall be installed above a sufficient number of sprinkler heads closest to the vacuum breaker assembly so that at no time will it be subjected to back pressure or drainage.
5. All exposed cast iron shall be painted with one coat of red lead and two finish coats of exterior enamel.

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONTINUOUS PRESSURE OR REDUCED PRESSURE VACUUM BREAKER ASSEMBLY (3" AND LARGER)		<i>Allen A. Kuehn</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER I-9	



NOTES

1. Not for use in traffic areas.
2. All check valves shall have test cocks.
3. Use concrete block supports (2 req'd) when needed to match shallow meter installation.
4. All nipples and pipe fittings shall be red brass.
5. Gate valve handwheel shall be red brass or bronze.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

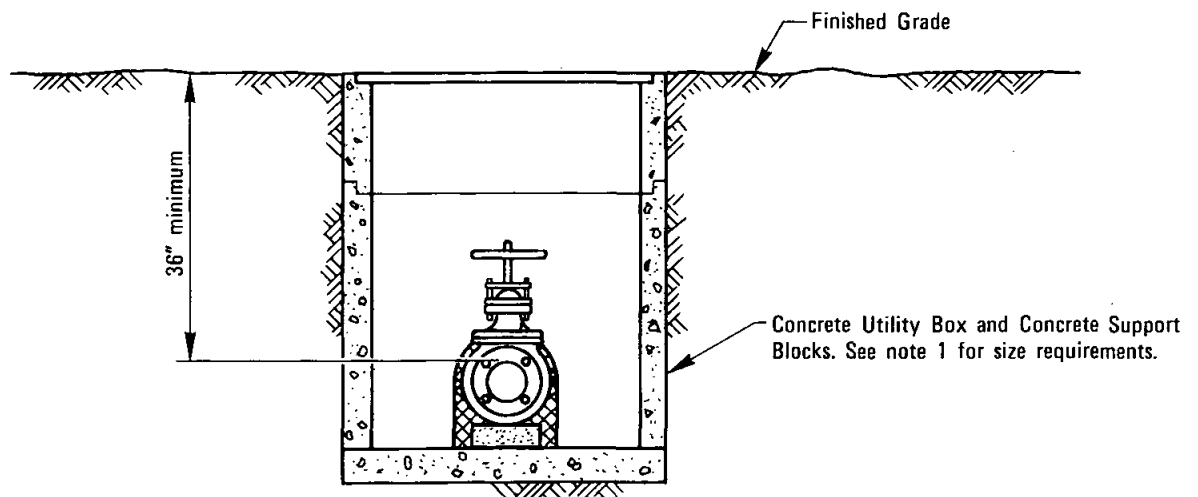
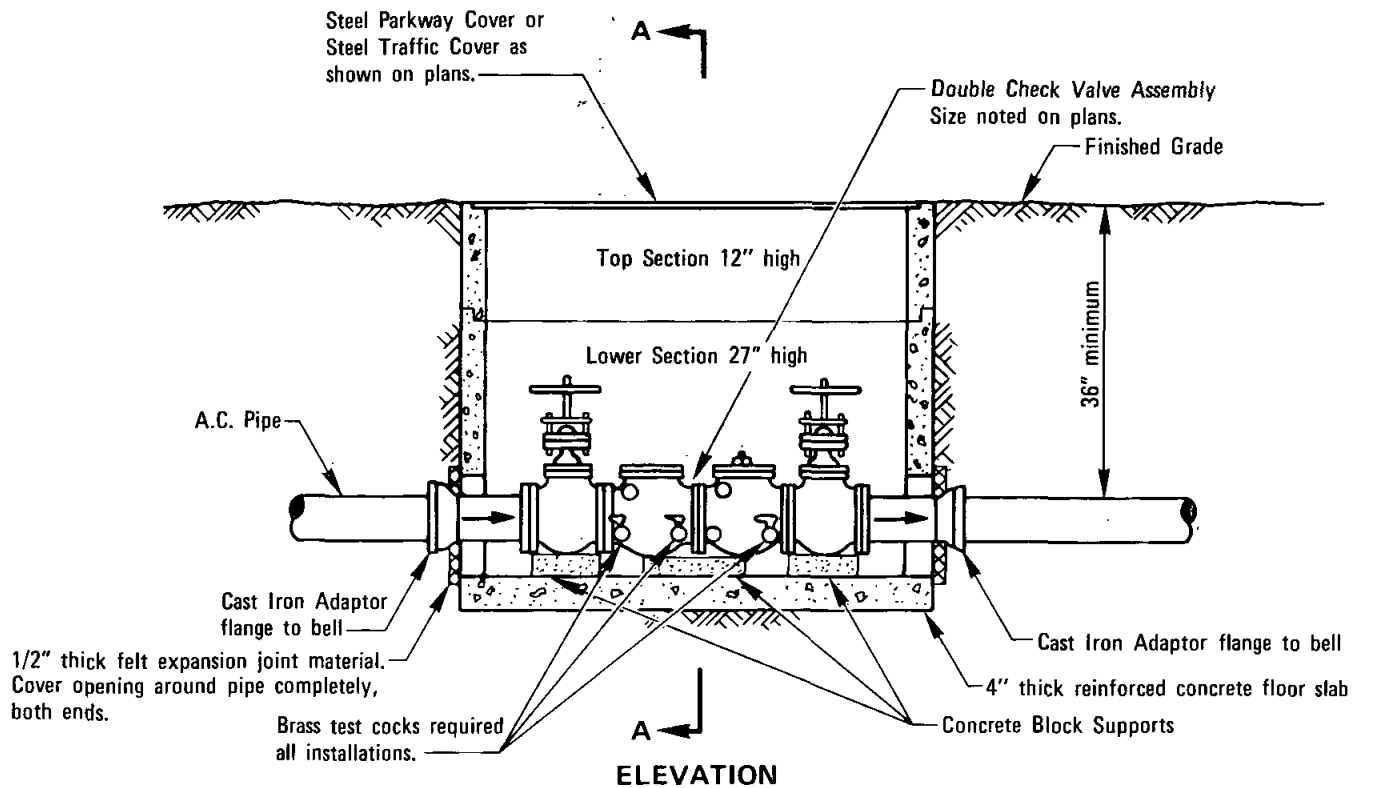
DRAWING
NUMBER

I-10

SAN DIEGO REGIONAL STANDARD DRAWING

DOUBLE CHECK VALVE ASSEMBLY (2" AND SMALLER)

Revision	By	Approved	Date



SECTION A-A

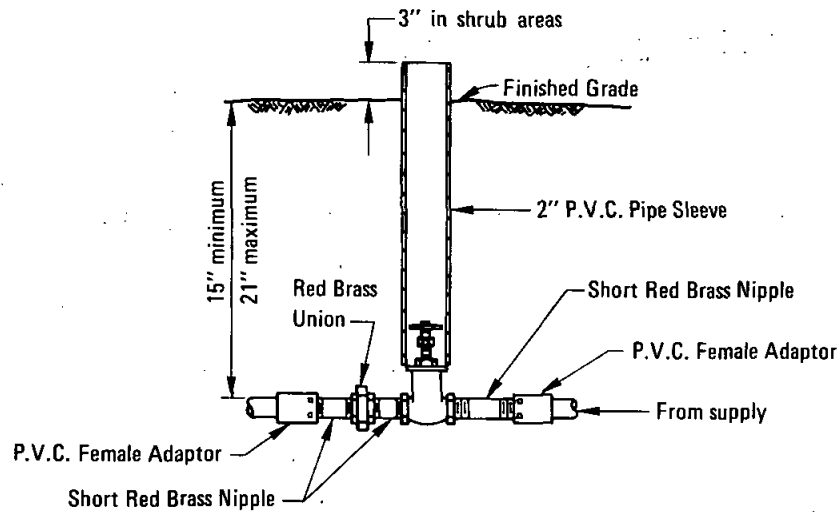
NOTES

- 3" and 4" pipe: 2'-6" x 4'-0" utility box with 4" walls.
6" and 8" pipe: 2'-6" x 6'-0" utility box with 4" walls.
- All exposed cast iron shall be painted with one coat of red lead and two finish coats of exterior enamel.

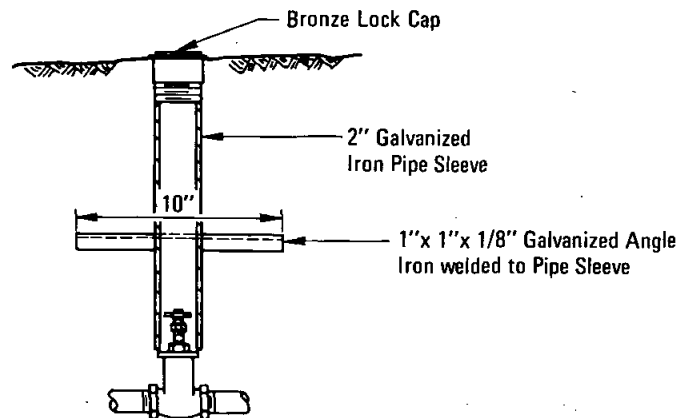
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Allan G. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
				DOUBLE CHECK VALVE ASSEMBLY (3" AND LARGER)		DRAWING NUMBER	
						I-11	



STANDARD INSTALLATION



ALTERNATE PIPE SLEEVE INSTALLATION

NOTES

1. All valves shall be furnished with a standard manual control valve bronze cross handle.
2. All valves shall be installed with a union on the downstream side of the valve. The union may be part of the valve or furnished separately—unions shall be ground joint, red brass or bronze.
3. All valves shall be installed within 12" of the water main, unless otherwise shown on the plans.
4. Close nipples shall not be used.

LEGEND ON PLANS



G.V.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

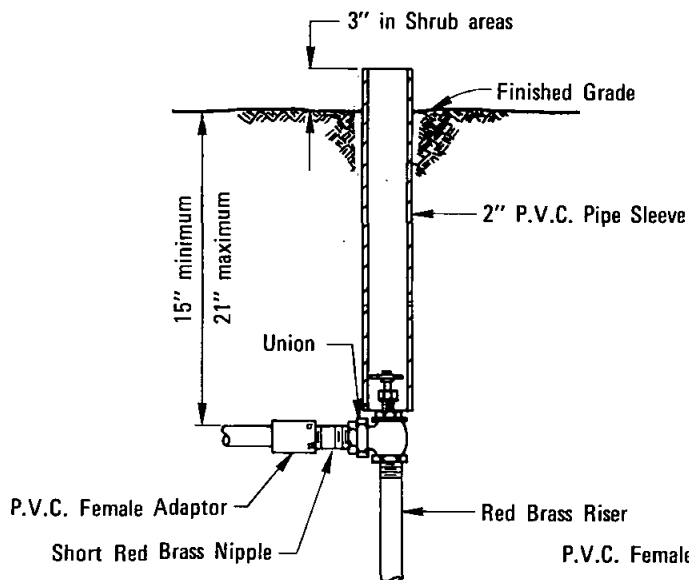
DRAWING
NUMBER

I-12

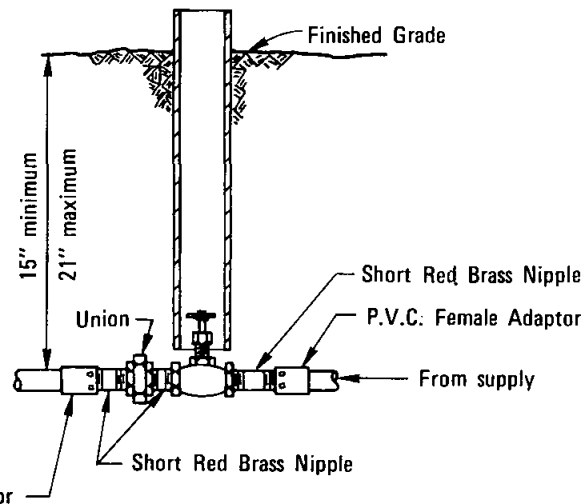
SAN DIEGO REGIONAL STANDARD DRAWING

GATE VALVE
(2" AND SMALLER)

Revision	By	Approved	Date



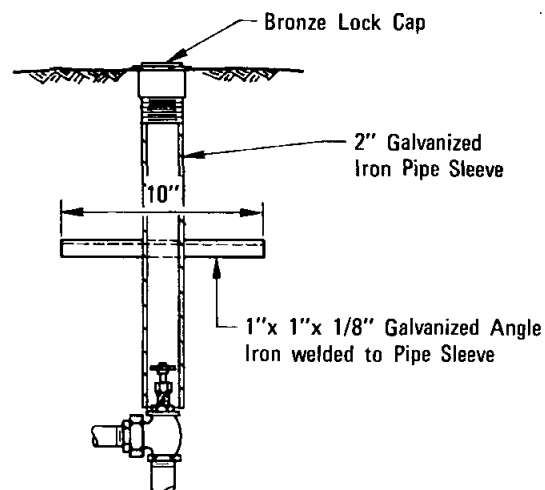
ANGLE VALVE



GLOBE VALVE
(special cases only)

NOTES

1. All Manual Valves shall be furnished with a standard manual control valve bronze cross handle.
2. All manual angle valves shall be installed with a union on the downstream side of the valve. The union may be part of the valve or furnished separately —unions shall be ground joint, red brass or bronze.
3. All valves shall be installed with 12" of the water main, unless otherwise shown on the plans.
4. All Manual Valves shall be furnished with a removable bonnet and packing gland nut.
5. Close Nipples shall not be used.



ALTERNATE PIPE SLEEVE INSTALLATION

LEGEND ON PLANS

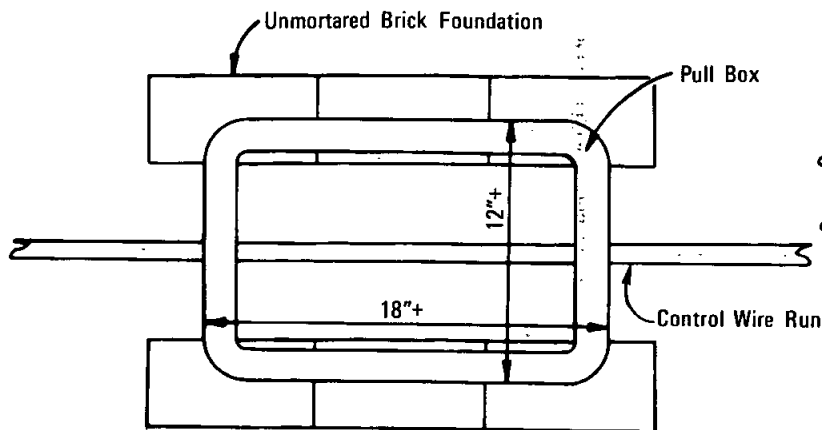


M.C.V.

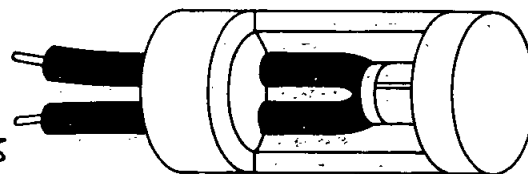
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
						<i>Allen G. Kuehn</i>	<i>Dec. 1975</i>
				MANUAL VALVES		Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	I-13



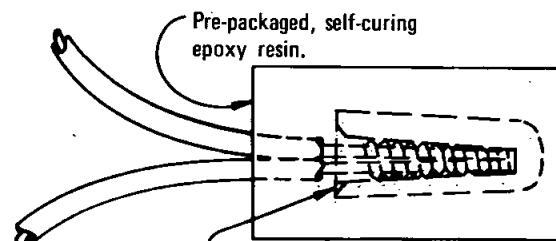
RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Alfred G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	SAN DIEGO REGIONAL STANDARD DRAWING	Revision	By	Approved	Date
DRAWING NUMBER I-14	REMOTE CONTROL VALVE				



PLAN VIEW

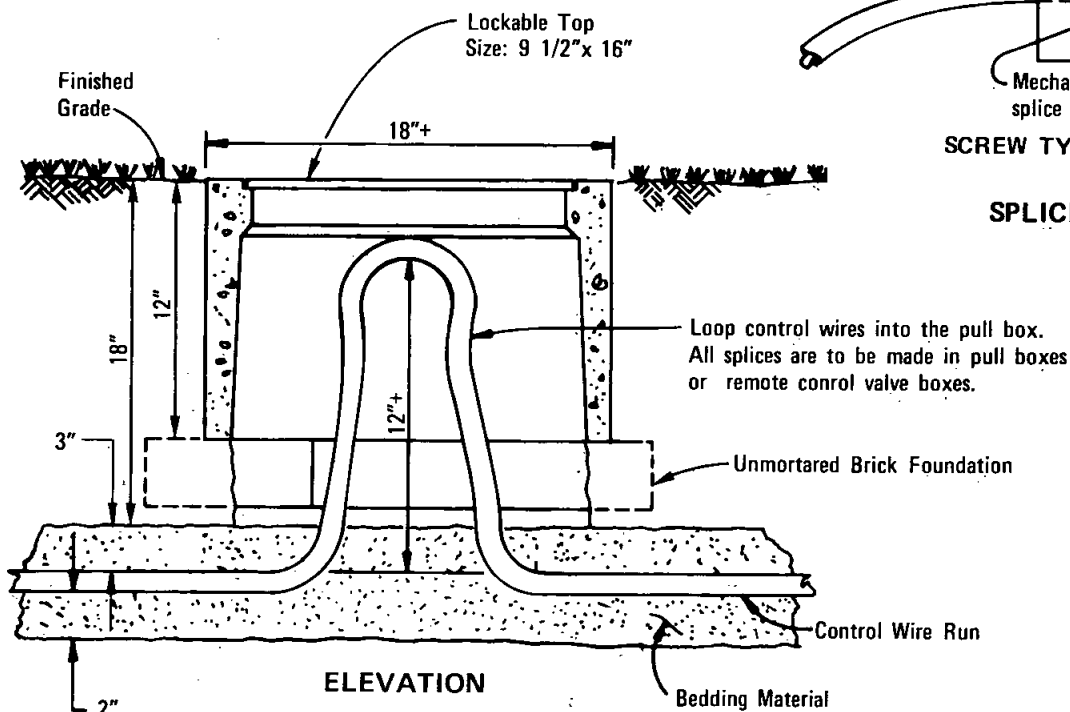


PEN-TITE WIRE CONNECTOR



SCREW TYPE CONNECTOR

SPLICE DETAILS



ELEVATION

NOTES

1. Install pull boxes as shown on plans.
2. At junctions where runs combine, splice common ground in pull box.
3. Pull box cover shall be permanently marked "ELECTRIC".
4. Conductors for each controller clock shall be harnessed separately and at sufficient intervals to maintain a definite bundle.
5. All splices shall be made with a properly set mechanical splice connector entirely enclosed in self-curing epoxy resin and shall be completely water-proof.
6. All spare wire ends shall be insulated in the same manner as wire splices.

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

ELECTRICAL PULL BOX FOR DIRECT BURIAL CONTROL WIRES AND SPLICE DETAILS

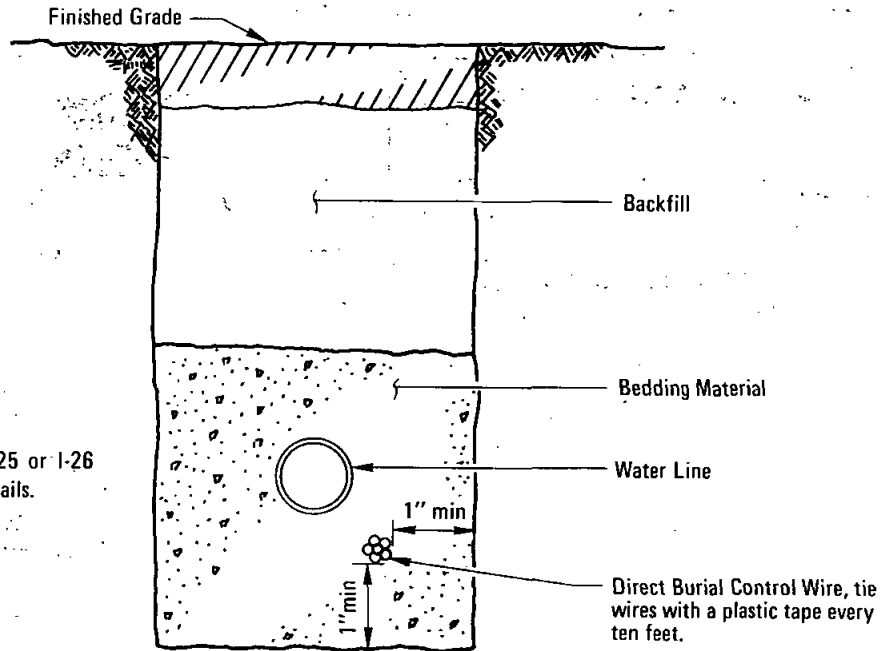
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

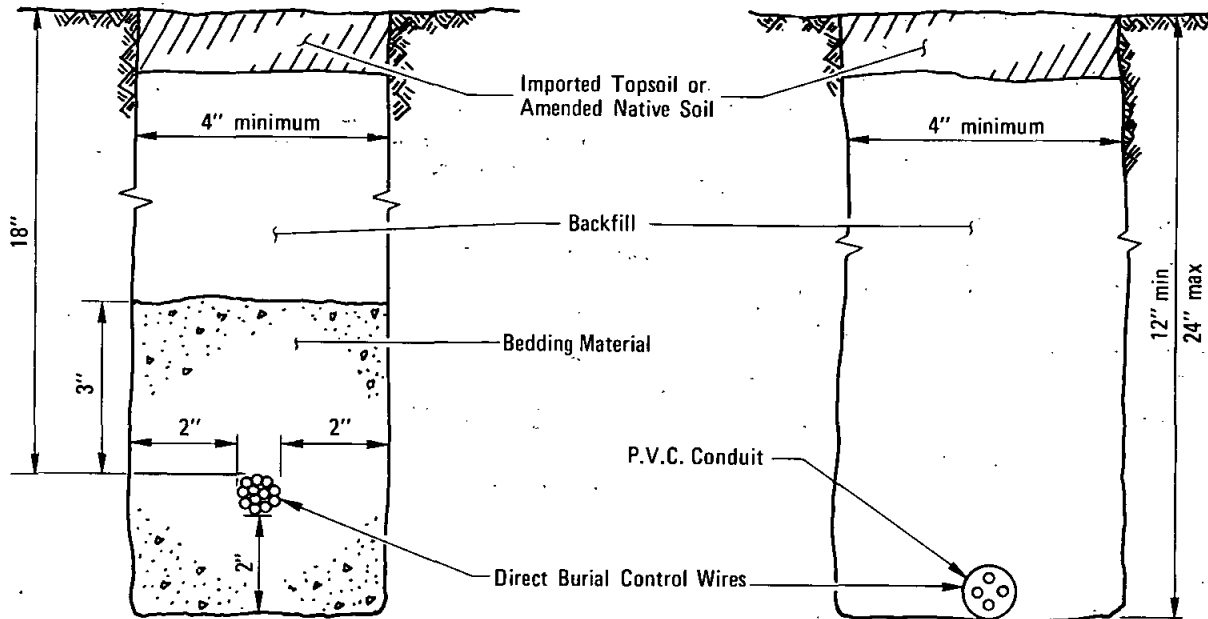
DRAWING
NUMBER **I-15**

NOTE

See Standard Drawing I-25 or I-26 for water line trench details.



NORMAL LOCATIONS OF CONTROL WIRES



ALTERNATE LOCATION OF CONTROL WIRES

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

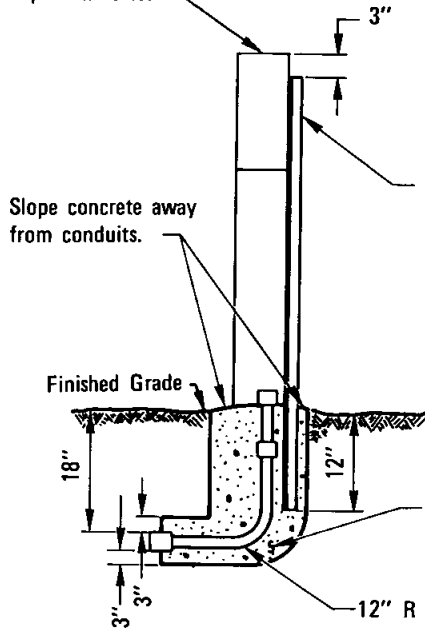
DRAWING
NUMBER **I-16**

SAN DIEGO REGIONAL STANDARD DRAWING

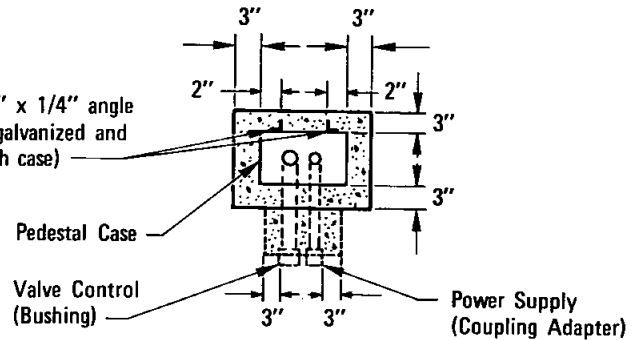
DIRECT BURIAL CONTROL WIRE

Revision	By	Approved	Date

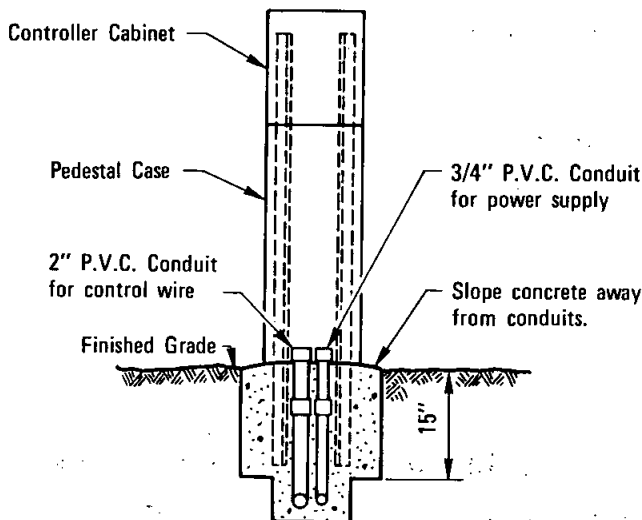
Automatic controller clock in weatherproof, tamperproof lockable case mounted on pedestal case.



SIDE VIEW



PLAN VIEW



ELEVATION

NOTES

1. Where two or more controllers are mounted on a common concrete base, a minimum of three inches shall be left between controller cabinets.
2. Anchor controller pedestal to base as required by manufacturer.
3. Make all electrical connections inside controller cabinet.
4. For location of supply conduit and conductors, see electrical plans.
5. Stiffeners shall be fastened to controller and pedestal cases by 3/16" x 3/4" O.N. cadmium plated stove bolts not more than 12" on center (minimum 6 bolts per stiffener).
6. Controller shall be grounded at power supply by ground wire.

LEGEND ON PLANS



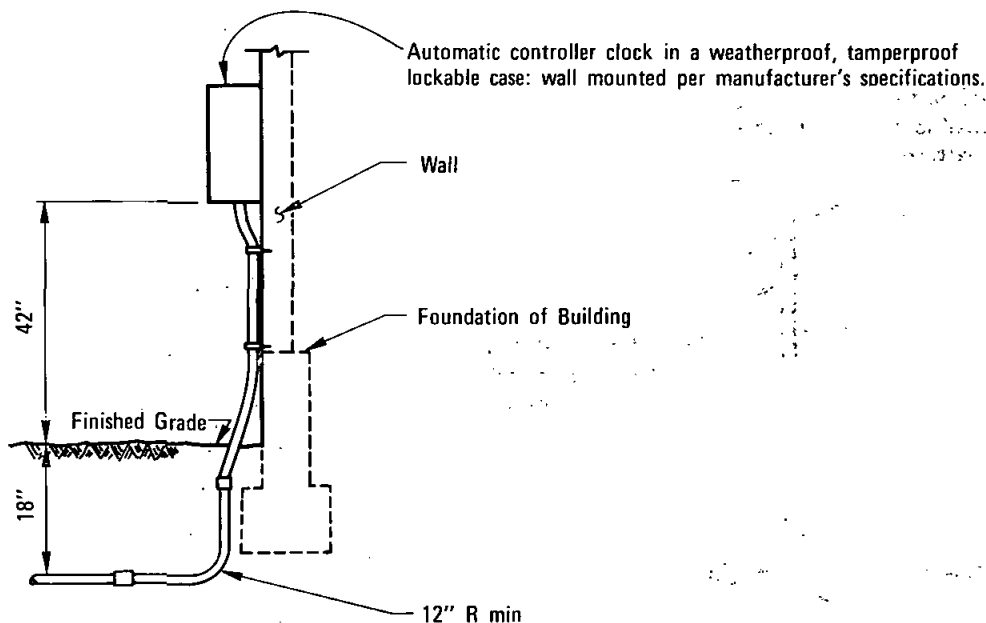
Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

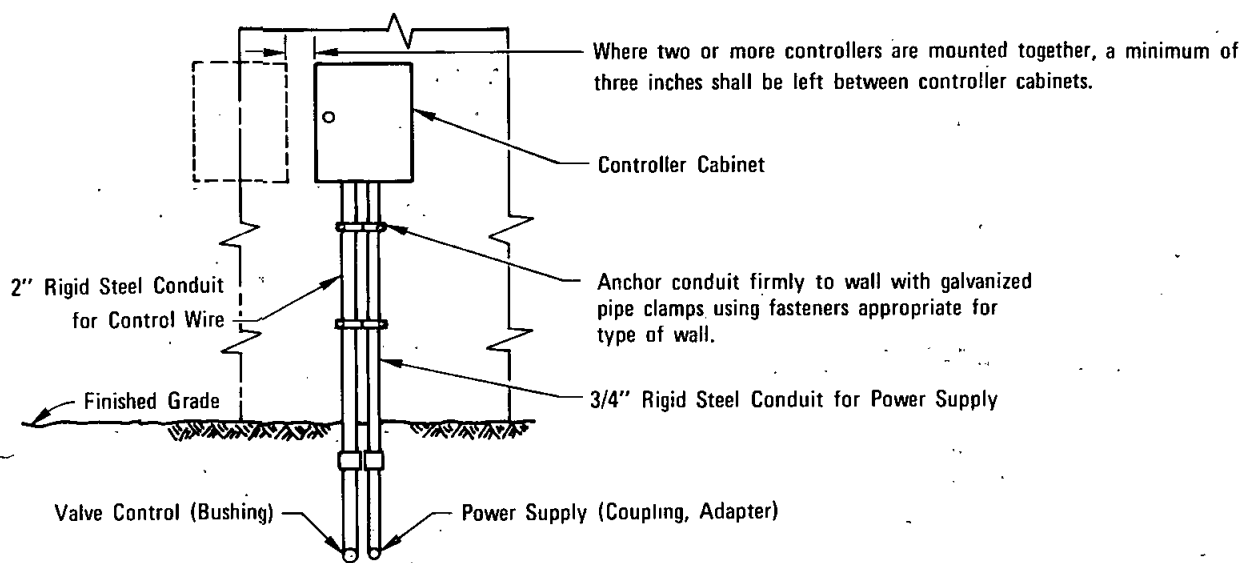
IRRIGATION SYSTEMS ELECTRIC CONTROLLER CLOCK PEDESTAL MOUNTING

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **I-17**



SIDE VIEW



ELEVATION

NOTES

1. For location of supply conduit and conductor, refer to the plans.
2. Controller shall be grounded at power supply by ground wire.
3. Make all electrical connections inside controller cabinet.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

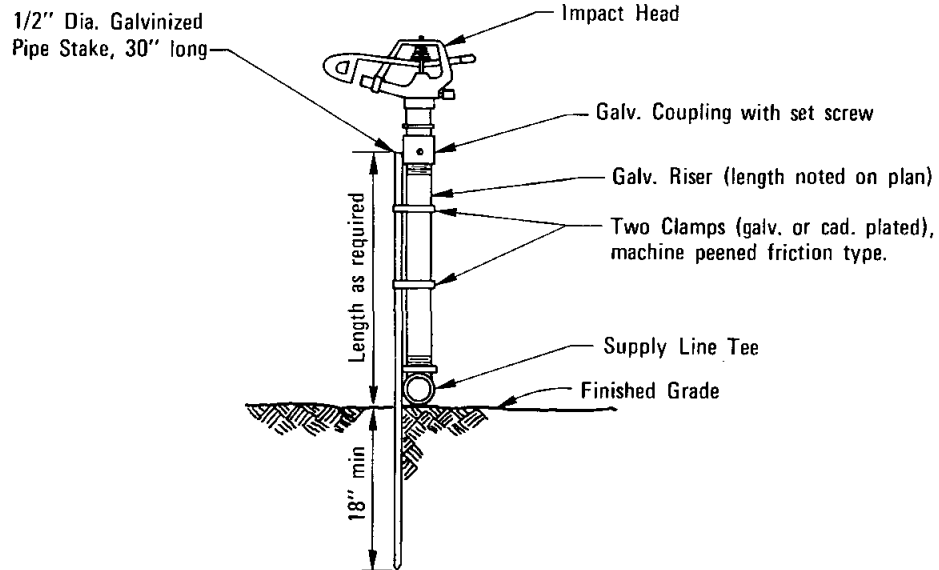
**DRAWING
NUMBER**

I-18

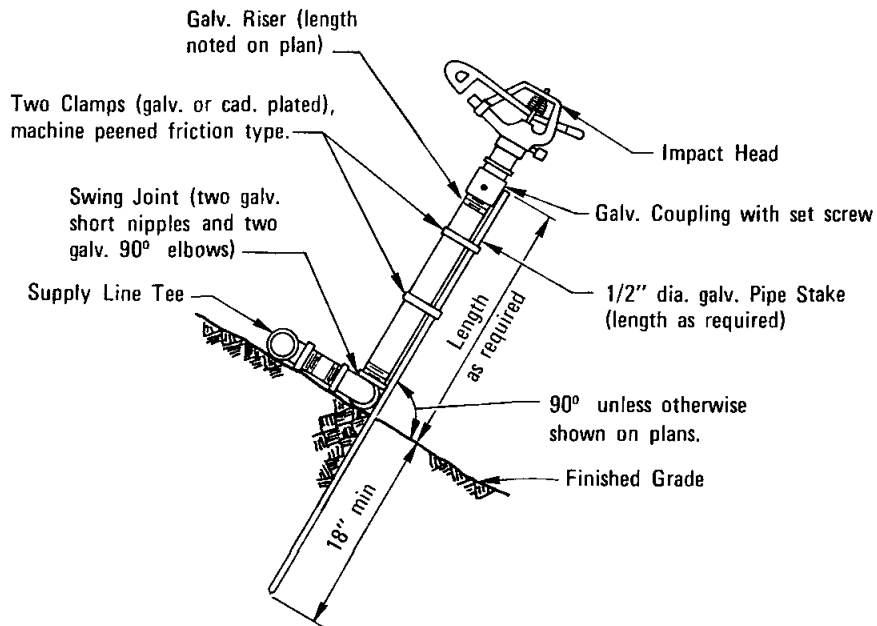
SAN DIEGO REGIONAL STANDARD DRAWING

**IRRIGATION SYSTEMS
ELECTRIC CONTROLLER CLOCK
WALL MOUNTING**

Revision	By	Approved	Date



LEVEL INSTALLATION



SLOPE INSTALLATION

LEGEND ON PLANS

Show a number to indicate type head —

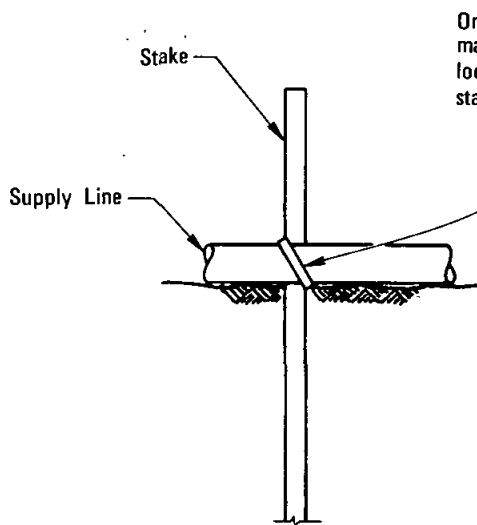
Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

**IMPACT HEAD
ABOVE GROUND PIPE INSTALLATIONS**

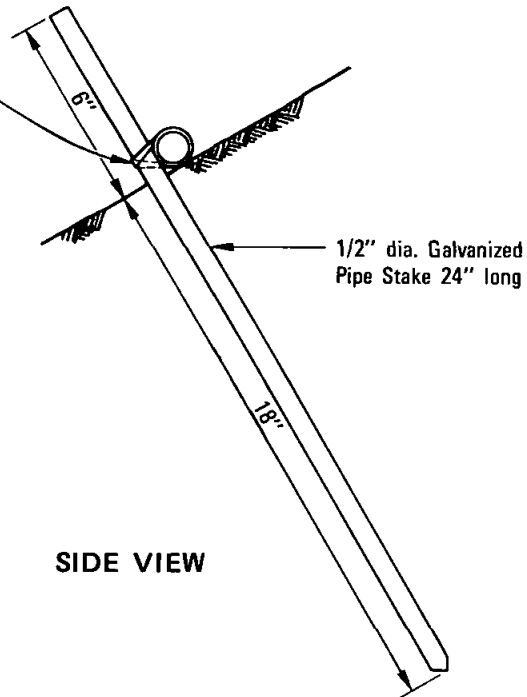
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan A. Kuehnel *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER I-19**



ELEVATION

One clamp (galv. or cad. plated)
machine peened friction type,
looped around supply line and
stake.



SIDE VIEW

NOTE

Stake shall be placed no greater than 15' apart and at each riser.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

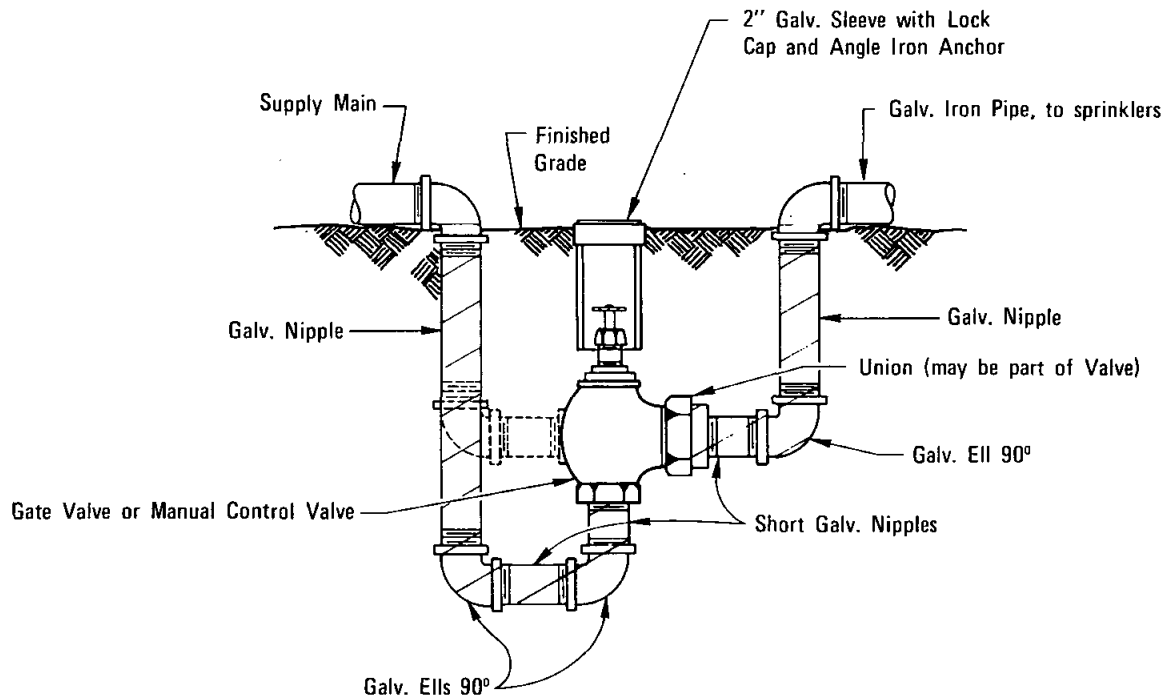
DRAWING
NUMBER

I-20

SAN DIEGO REGIONAL STANDARD DRAWING

**PINNING OF PIPE
ABOVE GROUND PIPE INSTALLATIONS**

Revision	By	Approved	Date



NOTE

All Galvanized Pipe, Nipples and Fittings installed underground shall be wrapped with 2" wide plastic backed adhesive tape, use 1/2" overlap.

LEGEND ON PLANS

— ⊗ — M.C.V.

— ⊗ — G.V.

Revision	By	Approved	Date
Note	SC	D.S.	7-79

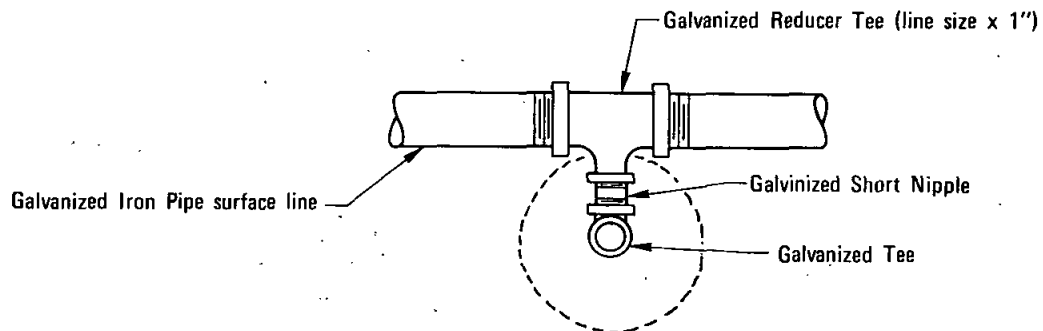
SAN DIEGO REGIONAL STANDARD DRAWING

MANUAL CONTROL VALVE AND GATE VALVE INSTALLATION FOR ABOVE GROUND PIPE INSTALLATIONS

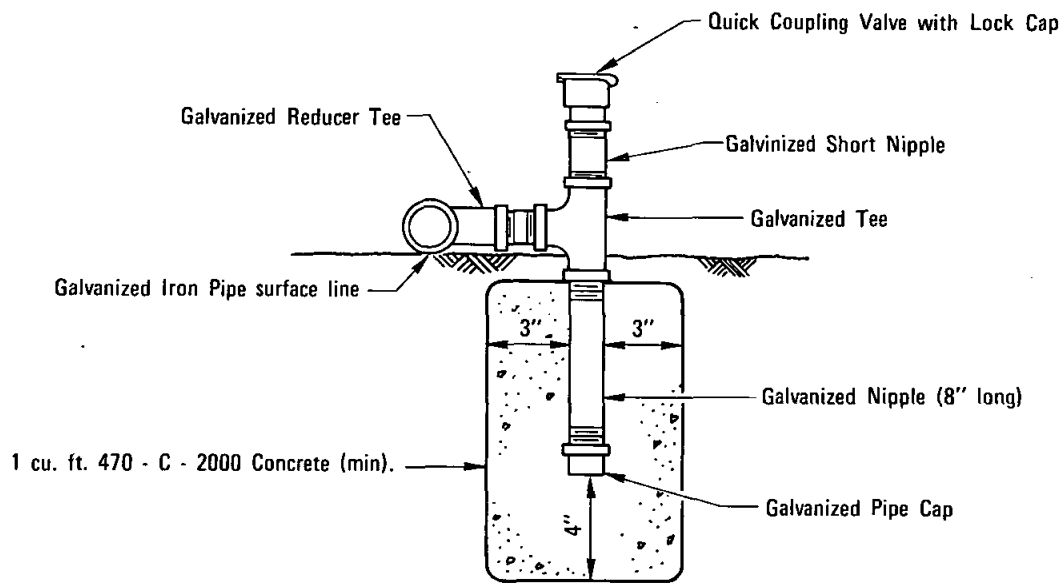
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **I-21**



PLAN



ELEVATION

LEGEND ON PLANS



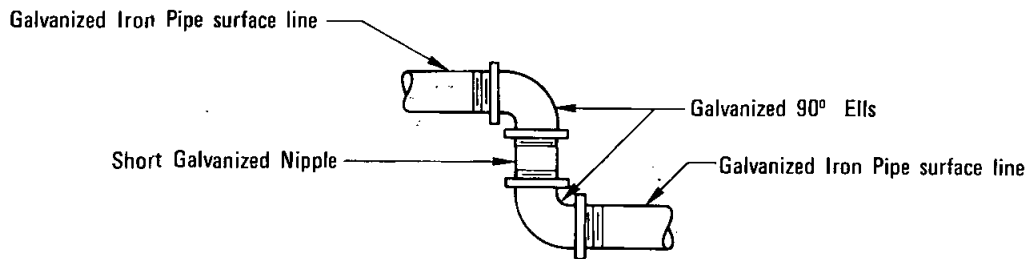
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allen A. Kuehn Dec. 1975
Coordinator R.C.E. 19807. Date

SAN DIEGO REGIONAL STANDARD DRAWING

**QUICK COUPLER ASSEMBLY
ABOVE GROUND PIPE INSTALLATIONS**

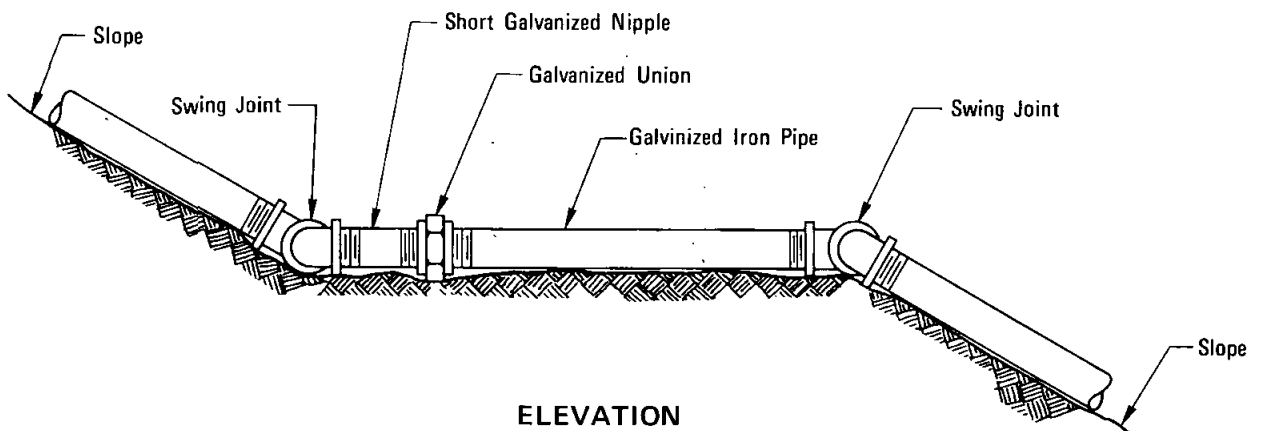
DRAWING
NUMBER **1-22**

Revision	By	Approved	Date



SWING JOINT DETAIL

PLAN

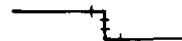


ELEVATION

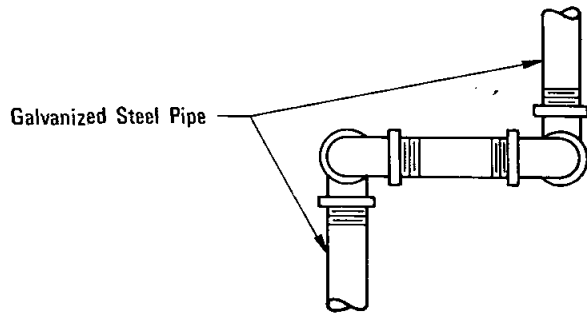
NOTE

Swing Joints shall be used at each change of grade.

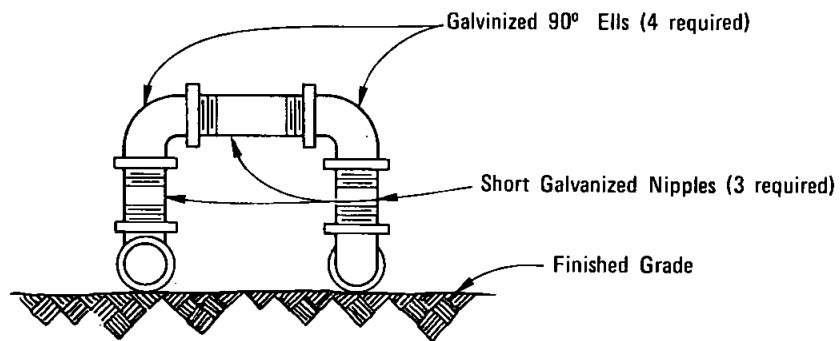
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING SWING JOINT AND PIPE INSTALLATION ON SLOPES ABOVE GROUND PIPE INSTALLATIONS	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Alfred G. Kuehn</i> <i>Dec. 1975</i> Coordinator - R.C.E. 19807 Date	DRAWING NUMBER I-23



PLAN

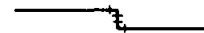


ELEVATION

NOTES

1. Double swing joint shall be used where changes of grade and alignment occur simultaneously.
2. Double swing joint shall be used for expansion joint on long runs of galvanized pipe.
(300' maximum runs)

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

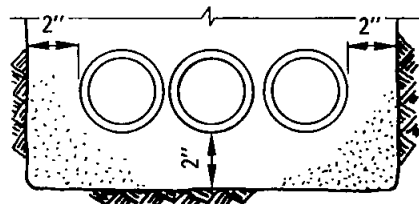
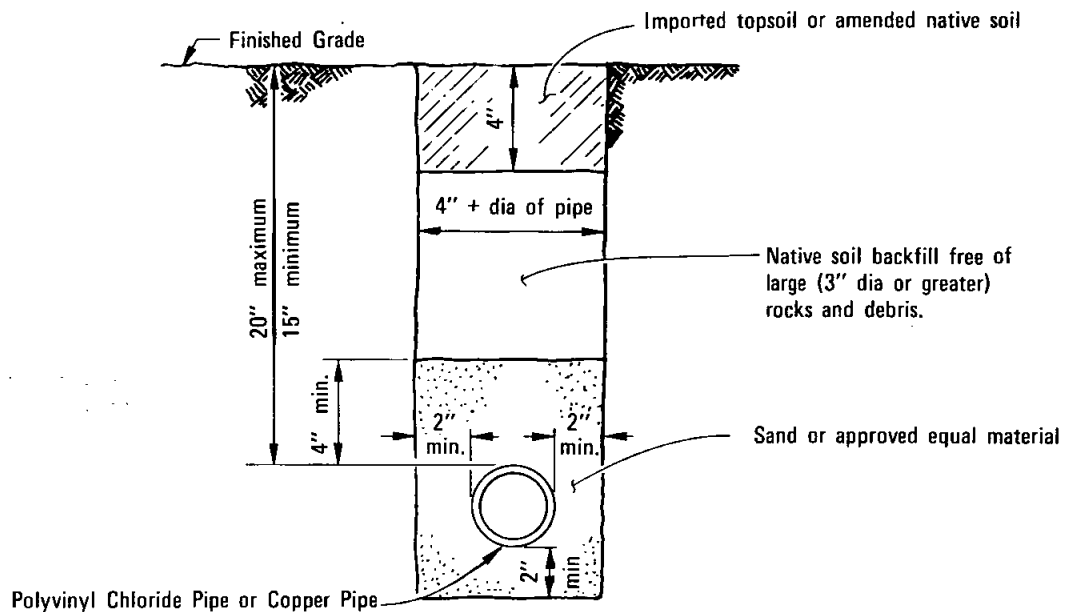
DRAWING
NUMBER

1-24

SAN DIEGO REGIONAL STANDARD DRAWING

**DOUBLE SWING JOINT
ABOVE GROUND PIPE INSTALLATIONS**

Revision	By	Approved	Date



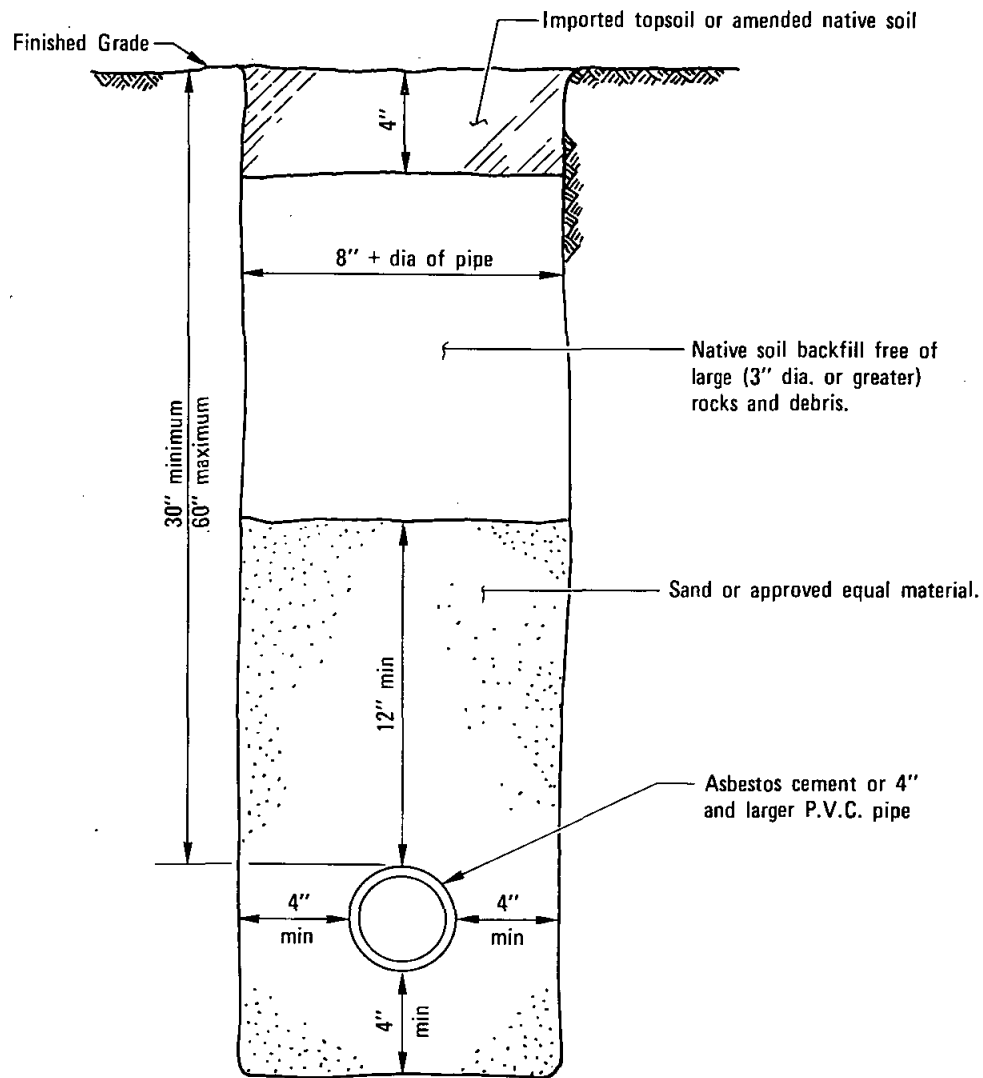
Details not shown
are same as above.

**Multiple Pipe Installation Detail
(non-pressure pipe only)**

NOTES

1. Backfill material shall be compacted to a relative compaction of 90% or more.
2. No P.V.C. pressure pipeline shall be installed within 3' of, and parallel to another line, unless otherwise specified.
3. All P.V.C. pipe shall lay free in the trench with no induced strain and with sufficient allowance for expansion and contraction as recommended by the manufacturer.
4. Teflon tape, 3/4" wide, shall be used on all threaded connections.
5. The letter W shall be stamped or chiseled on the improvement (curb-sidewalk) directly above the pressure pipeline.
6. All plastic pressure pipe under pavement shall be installed in a P.V.C. sleeve.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TRENCH DETAIL P.V.C. AND/OR COPPER PIPE (3" AND SMALLER)		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	I-25



NOTES

1. Backfill material shall be compacted to a relative compaction of 90% or more.
2. All pipeline fittings shall be cast iron, short body, Class 250, cement mortar lined and polyethylene wrapped. All fittings shall have thrust blocks or anchors.
3. The letter W shall be stamped or chiseled on the improvement (curb-sidewalk) directly above the pressure pipeline.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

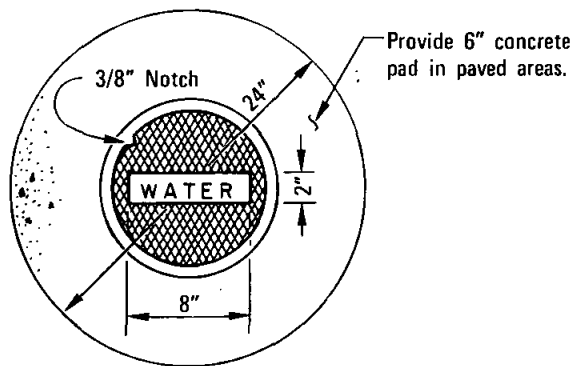
DRAWING
NUMBER

I-26

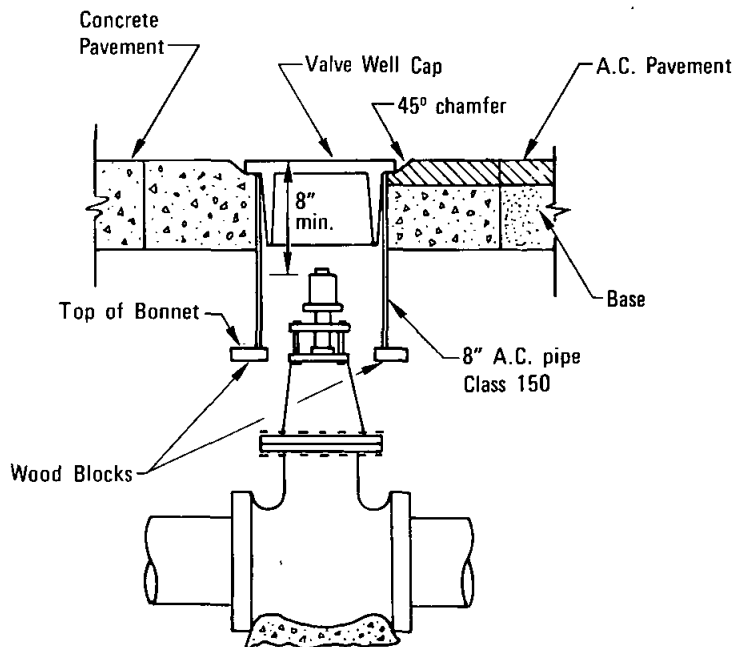
SAN DIEGO REGIONAL STANDARD DRAWING

TRENCH DETAIL ASBESTOS CEMENT PIPE & 4" AND LARGER P.V.C. PIPE

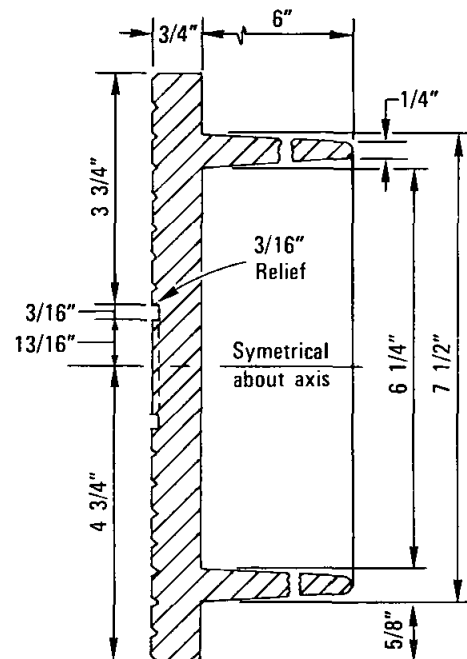
Revision	By	Approved	Date



PLAN



ELEVATION



CAST IRON
VALVE WELL CAP

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

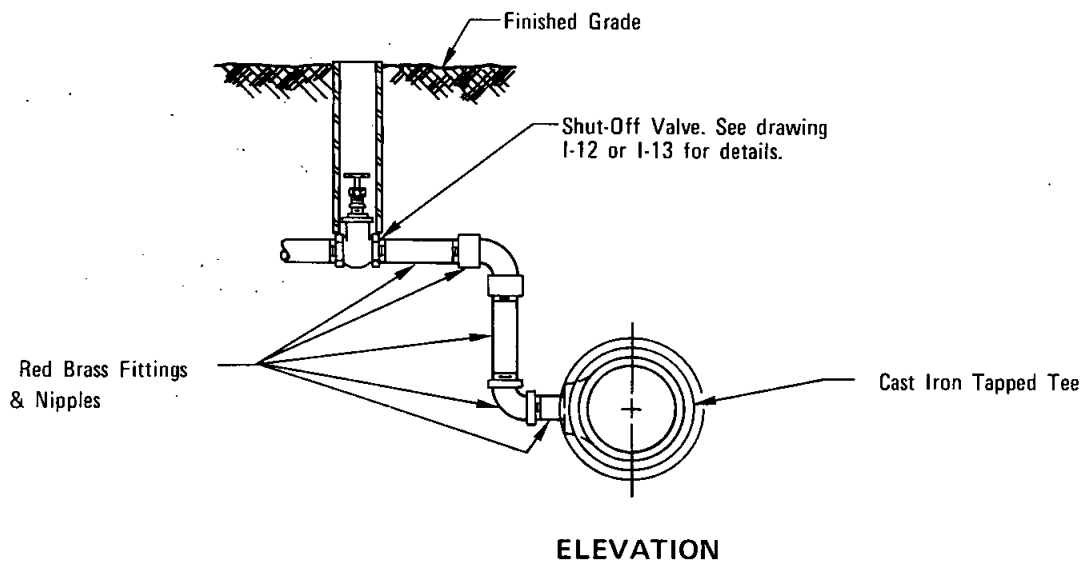
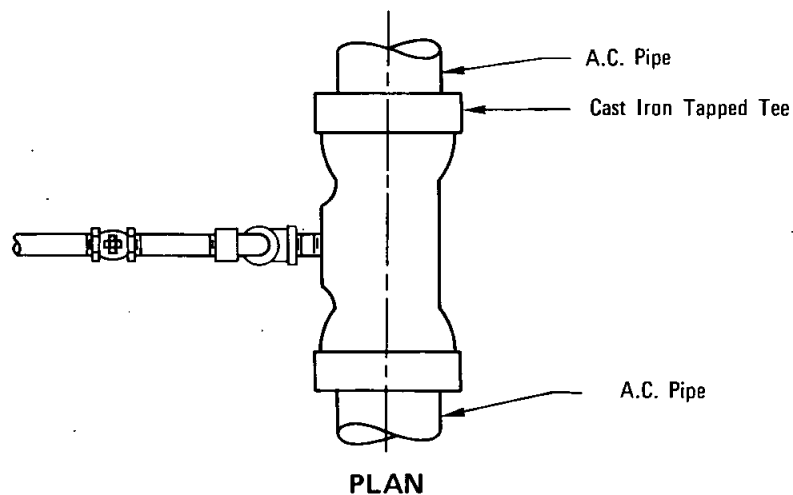
VALVE WELL AND COVER

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

I-27



NOTES

1. Close nipples shall not be used.
2. Cast iron tapped tee shall be short body, class 250, cement mortar lined and polyethylene wrapped.
3. All tapped tees shall have a type - A support block. See Standard Drawing W-19.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

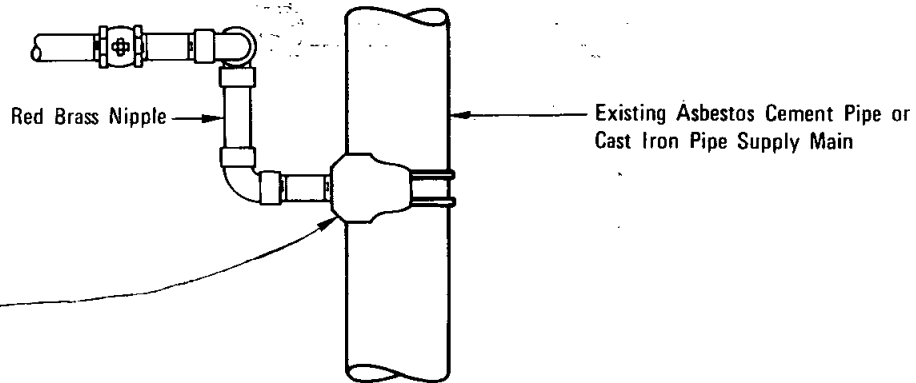
Allard A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

CONNECTION DETAIL FOR NEW ASBESTOS CEMENT SUPPLY MAINS

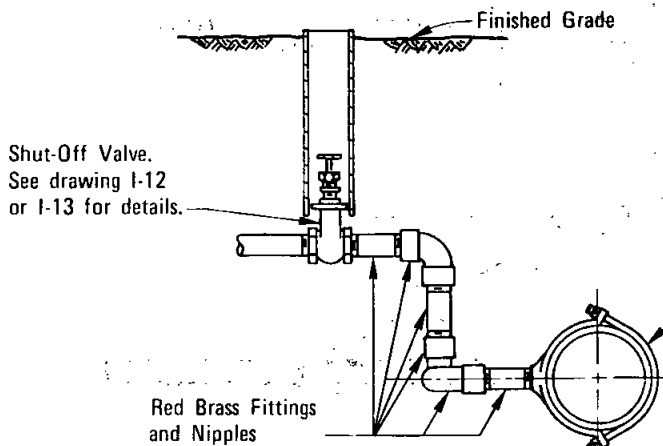
DRAWING
NUMBER **I-28**

Revision	By	Approved	Date



PLAN

May Be: Bronze, double strap service clamp; cast iron tapped clamp coupling with stainless steel bolts; cast iron boltless tapping sleeve; or cast iron (cement mortar lined) cutting in tapped tee.



ELEVATION

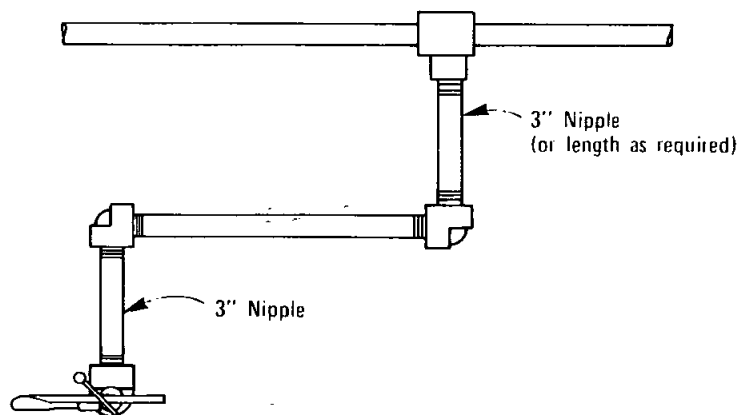
NOTE

Close nipples shall not be used.

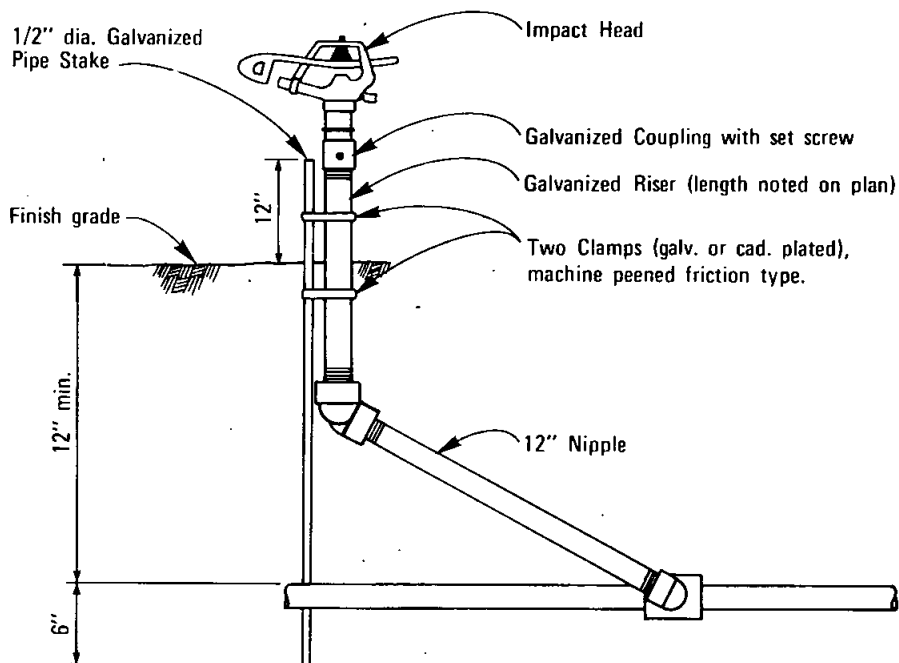
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				CONNECTION DETAIL FOR EXISTING SUPPLY MAINS		<i>Allard A. Kuehn</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
				DRAWING NUMBER I-29		



PLAN



ELEVATION

NOTES

1. All fittings shall be P.V.C. Sch. 40 (except as noted).
2. All nipples shall be P.V.C. Sch. 80 (except as noted).
3. Teflon tape, 3/4" wide, shall be used on all threaded connections.
4. Short nipples shall not be used.

LEGEND ON PLANS

Show a number to indicate type head



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

David J. Solomon *Chair* 1979
Coordinator R.C.E. 25291 Date

DRAWING
NUMBER

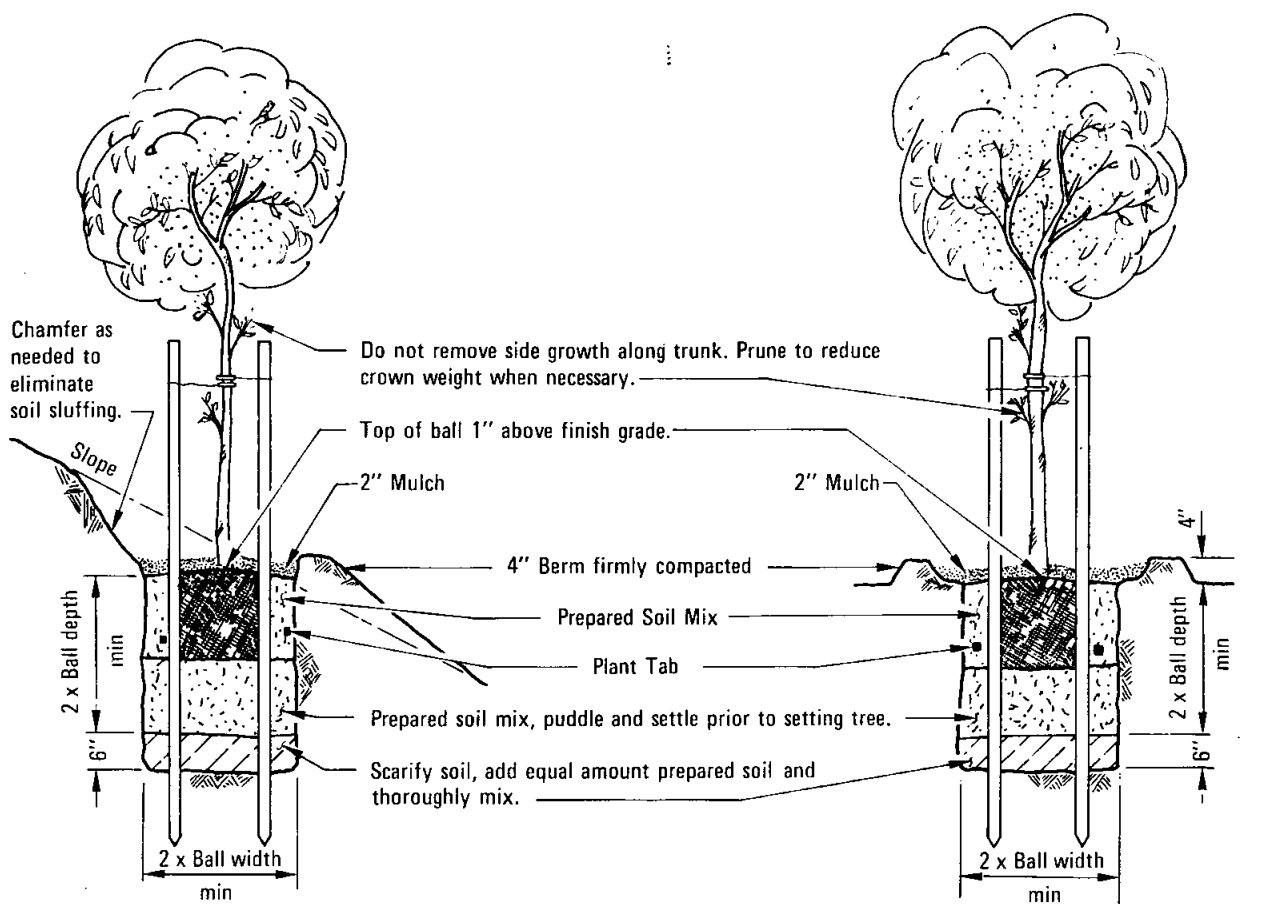
I-30

SAN DIEGO REGIONAL STANDARD DRAWING

IMPACT HEAD
(WITH SWING JOINT)

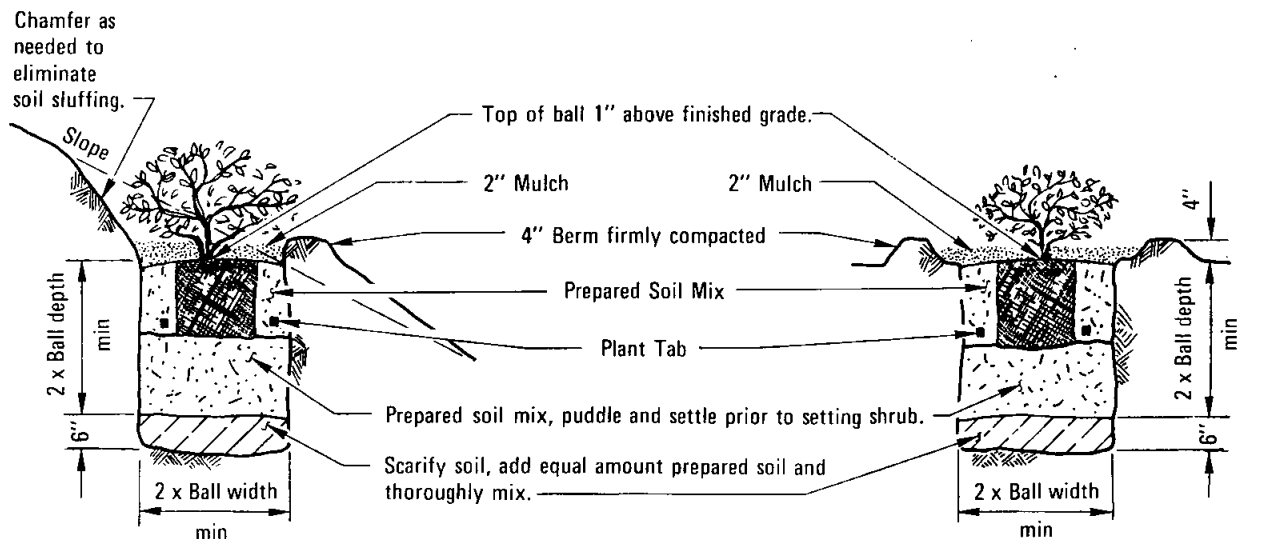
Revision	By	Approved	Date

LANDSCAPING



TREE PLANTING - SLOPES

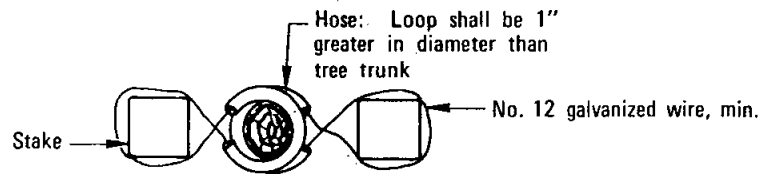
TREE PLANTING - LEVEL GROUND



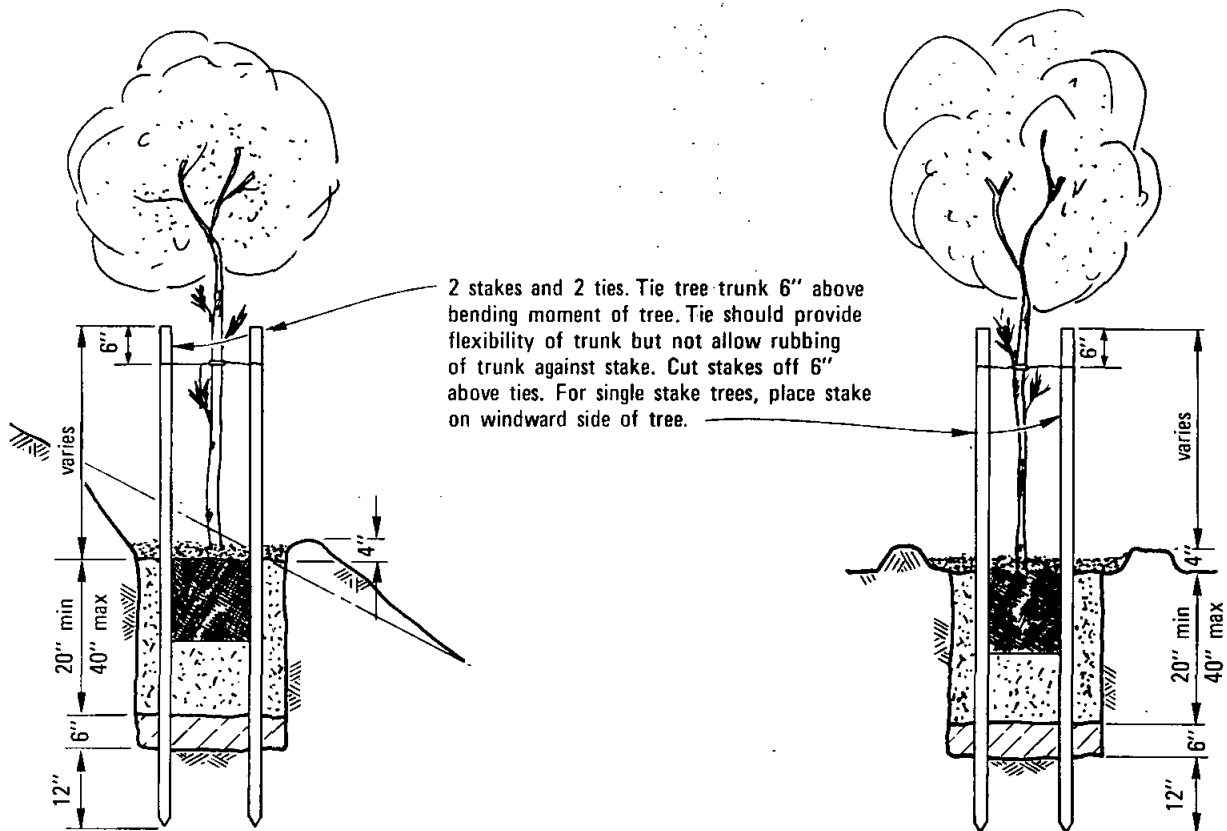
SHRUB PLANTING - SLOPES

SHRUB PLANTING - LEVEL GROUND

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				TREE AND SHRUB PLANTING		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	L-1



PLAN



TREE STAKING - SLOPES

TREE STAKING - LEVEL GROUND

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kershner Dec. 1975
Coordinator H.C.E. 19807 Date

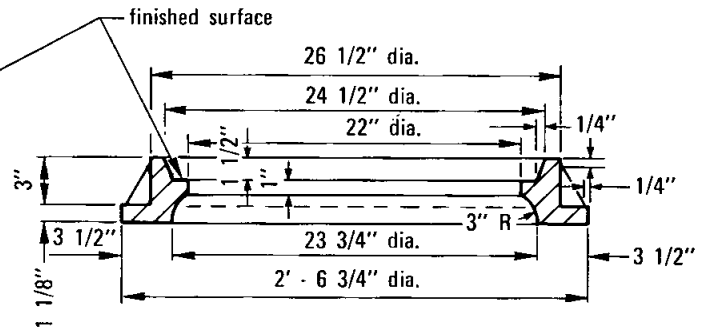
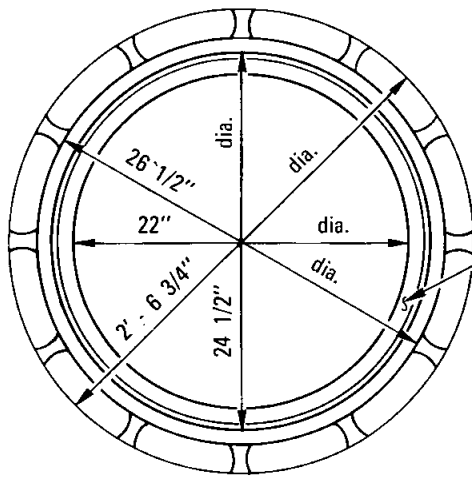
DRAWING
NUMBER **L-2**

SAN DIEGO REGIONAL STANDARD DRAWING

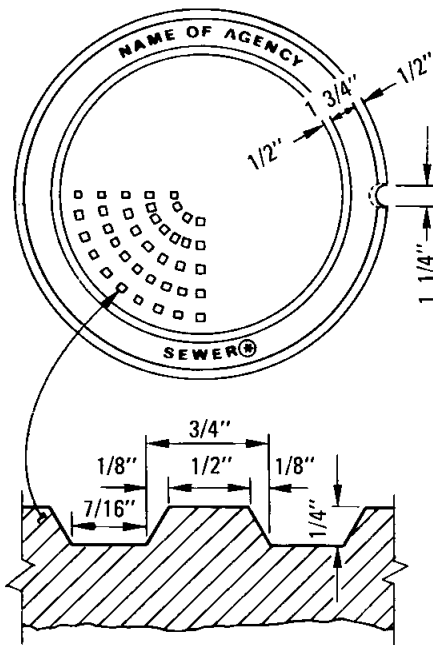
TREE STAKING

Revision	By	Approved	Date
Plan	SC	D. S.	7.79

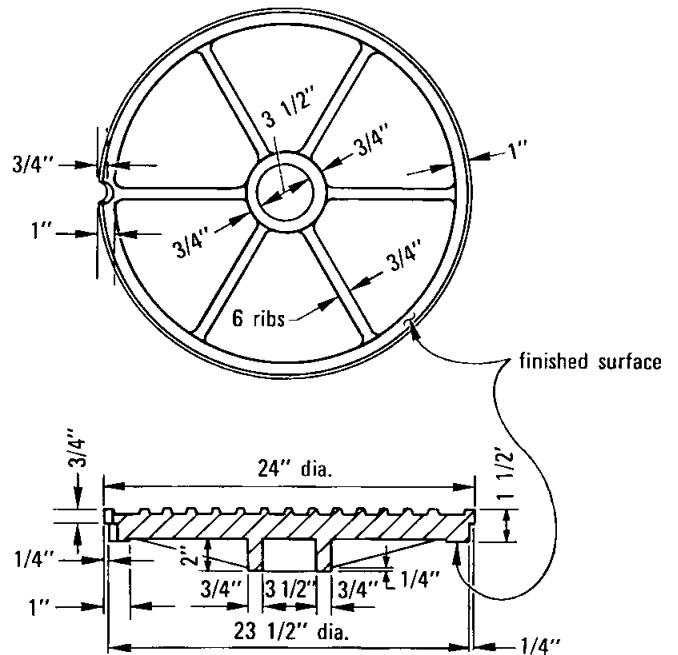
MISCELLANEOUS



MANHOLE COVER FRAME
CAST IRON WT. 175 LB.



DETAIL



MANHOLE COVER
CAST IRON WT. 155 LB.

NOTES

1. Frame and cover shall be cast iron.
2. Weights: Frame 175 lbs.
Cover 155 lbs.

FOR	MARK
Sewer Projects	Sewer
Storm Drain Projects	Storm Drain
Water Projects	Water

Revision	By	Approved	Date

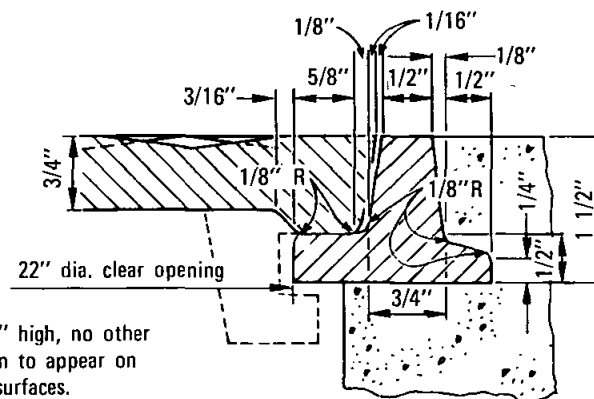
SAN DIEGO REGIONAL STANDARD DRAWING

24" MANHOLE FRAME AND COVER
HEAVY DUTY

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

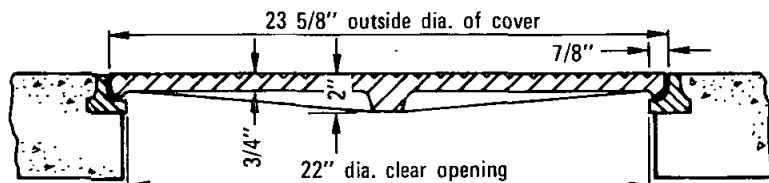
Allen A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER M-1

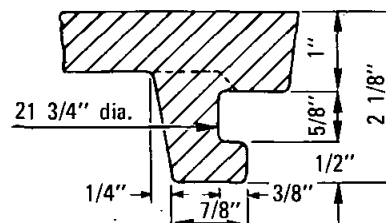


TOP OF FRAME & COVER

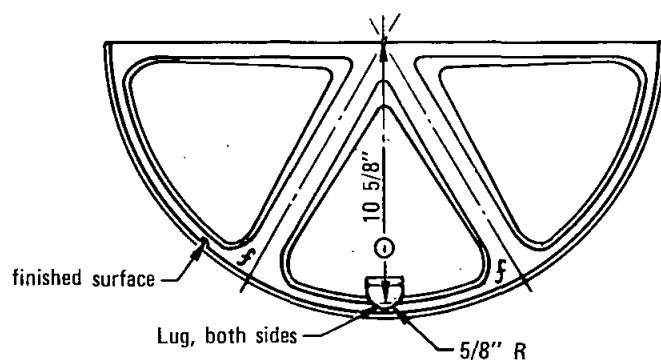
SECTION THROUGH RIM



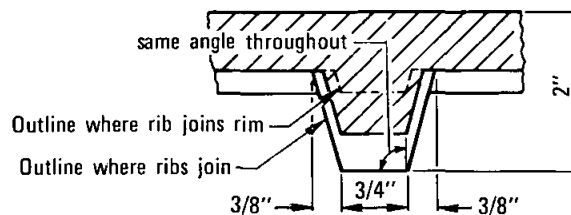
SECTION THROUGH FRAME & COVER



SECTION THROUGH LUG



BOTTOM OF COVER



SECTION THROUGH
RIB AT MID RADIUS

1. Frame and cover shall be cast iron.
2. Frame and cover for use in non-traffic area only.
3. Weights: Frame 30 lbs
 Cover 100 lbs

FOR	MARK
Sewer Projects	Sewer
Storm Drain Projects	Storm Drain
Water Projects	Water

Allard A. Karchenal Dec. 1975
Coordinator R.C.E. 19807 Date

M-2

SAN DIEGO REGIONAL STANDARD DRAWING

24" MANHOLE FRAME AND COVER LIGHT DUTY

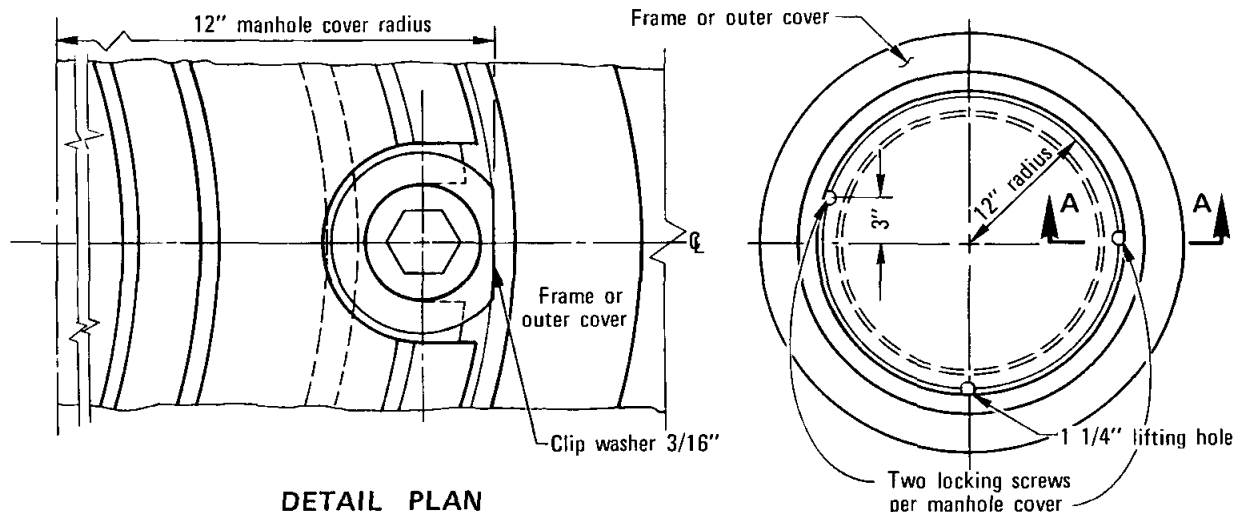
Revision	By	Approved	Date



2. Material: Cast Iron
3. Machine seats to prevent noise
4. Fillet radii to be 1/2".



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	36" MANHOLE FRAME AND TWO CONCENTRIC COVERS HEAVY DUTY	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
						<i>Allan G. Kuehn</i> <i>Dec. 1975</i>
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER
						M-3

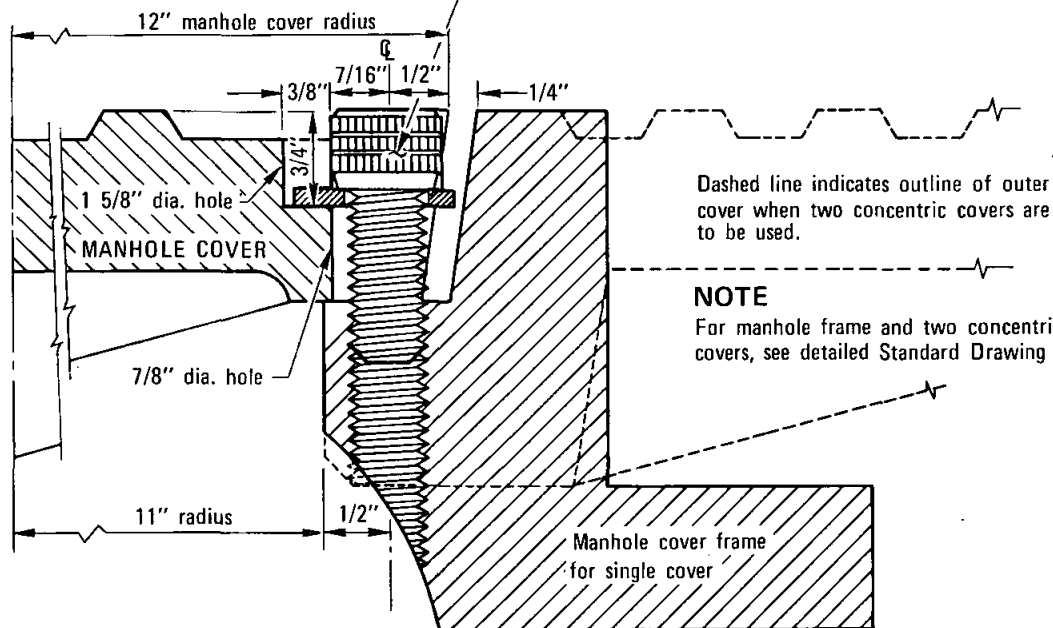


DETAIL PLAN

NOTE

For manhole frame and cover details, see Standard Drawing M-1 (single cover).

Drill and tap hole, install 5/8"x 1 1/2" stainless steel, hexagonal socket head cap screw (2 required), Unified National Coarse Thread -- 11 per inch -- with 1 1/2" O.D. x 11/16" I.D. x .078" thick stainless steel washer.
Use 18-8 stainless steel, A.S.T.M. Standard Specification A-276, Type 300 series.



Dashed line indicates outline of outer cover when two concentric covers are to be used.

NOTE

For manhole frame and two concentric covers, see detailed Standard Drawing M-3.

SECTION A-A

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

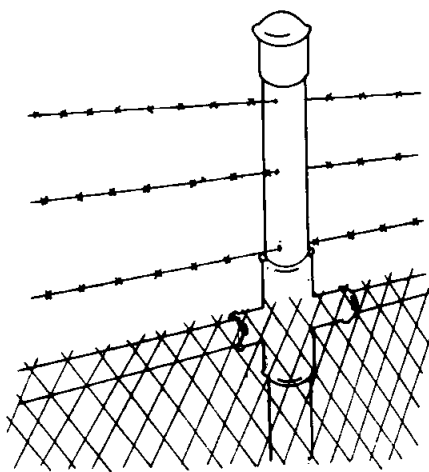
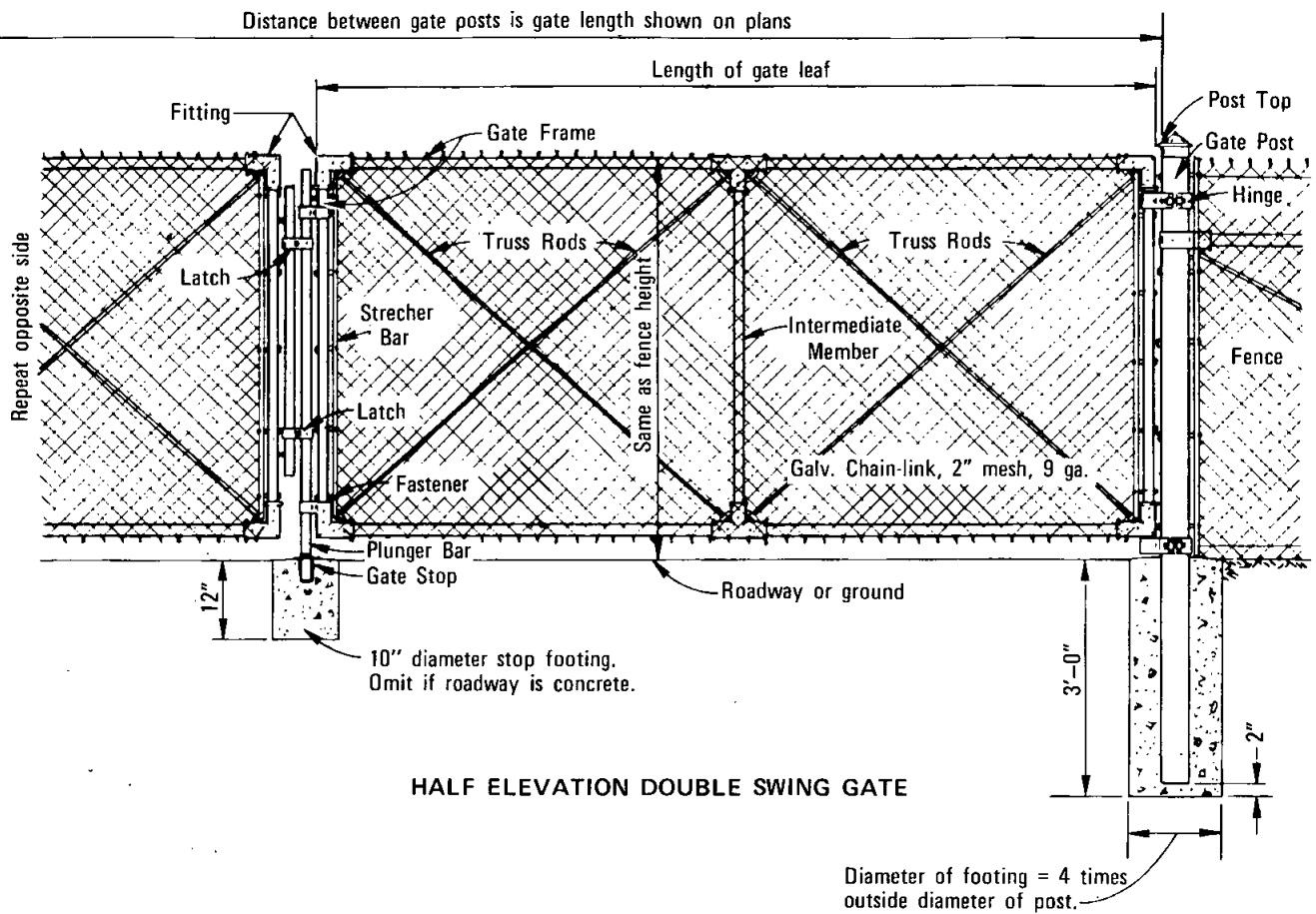
DRAWING
NUMBER

M-4

SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE COVER LOCKING DEVICE

Revision	By	Approved	Date

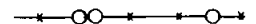


EXTENSION POST AND BARBED WIRE

NOTES

1. All footings shall be 470-C-2000 concrete.
2. The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions:
 - a. Barbed Wire
 - b. Extension Post

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

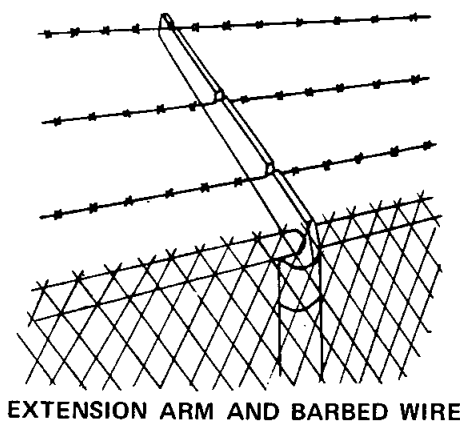
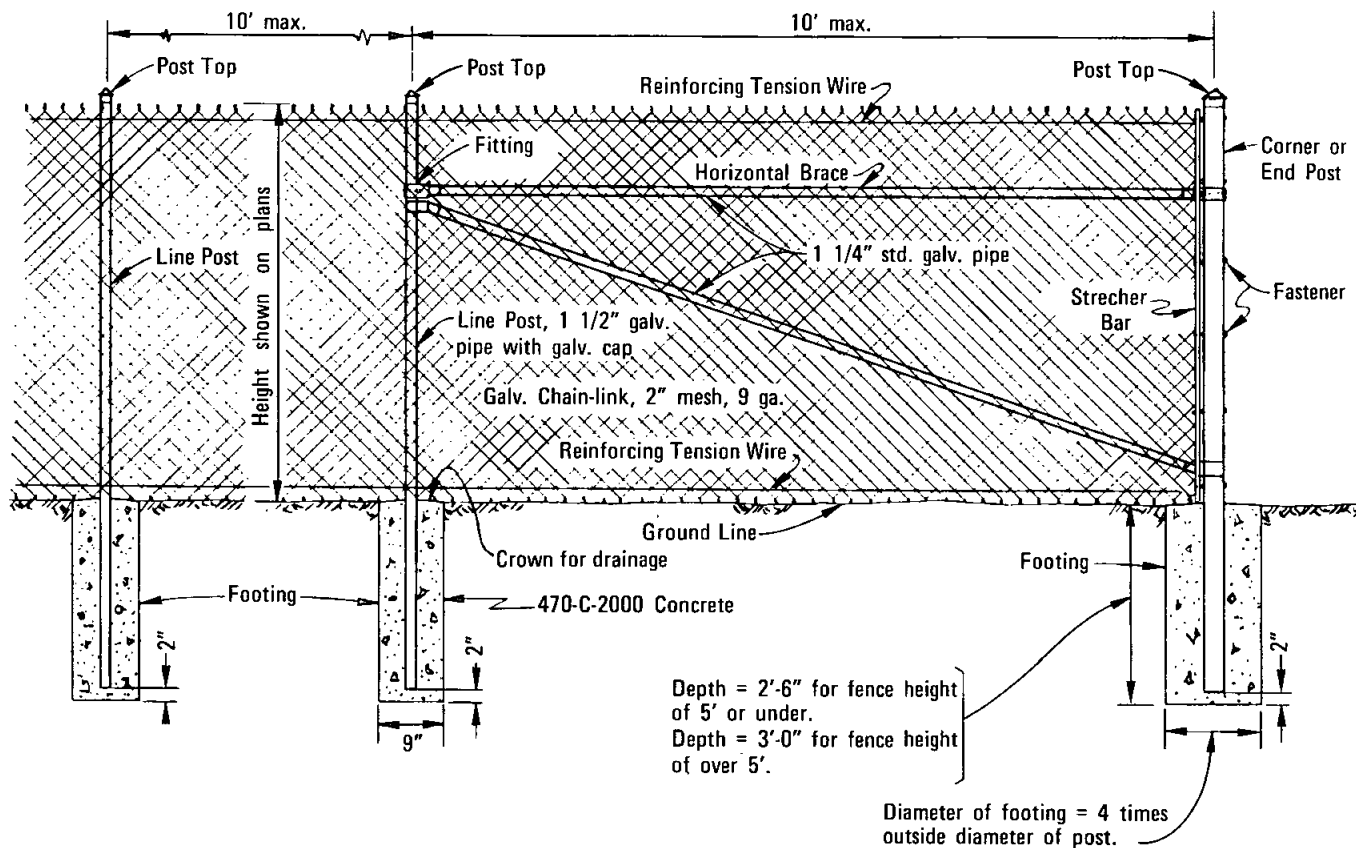
CHAIN LINK GATE

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER**

M-5



NOTES

1. All footings shall be 470-C-2000 concrete.
2. The following items shall be furnished and installed only when shown on the plans and/or called for in the special provisions:
 - a. Barbed Wire
 - b. Extension Arm
 - c. Top Horizontal Rail

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

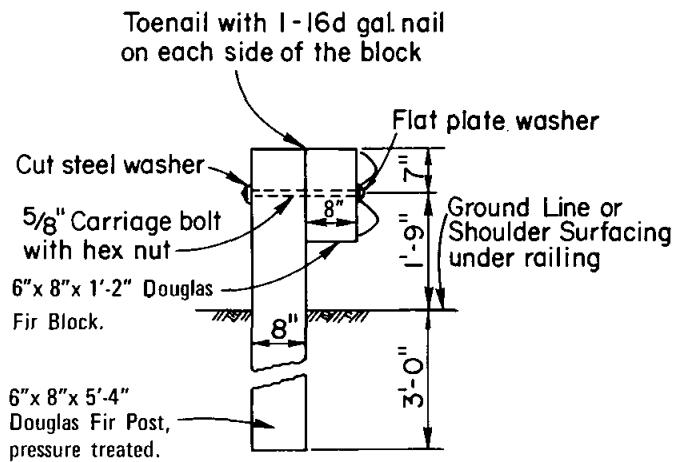
DRAWING
NUMBER

M-6

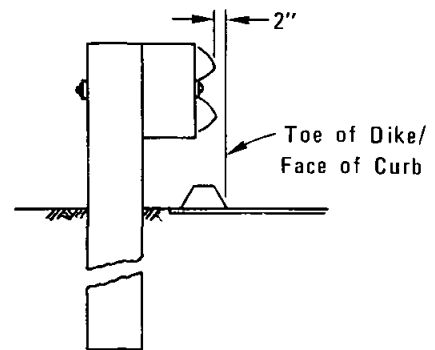
SAN DIEGO REGIONAL STANDARD DRAWING

CHAIN LINK FENCE

Revision	By	Approved	Date



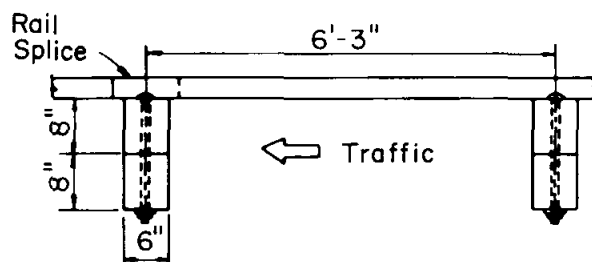
SECTION AT SUPPORT



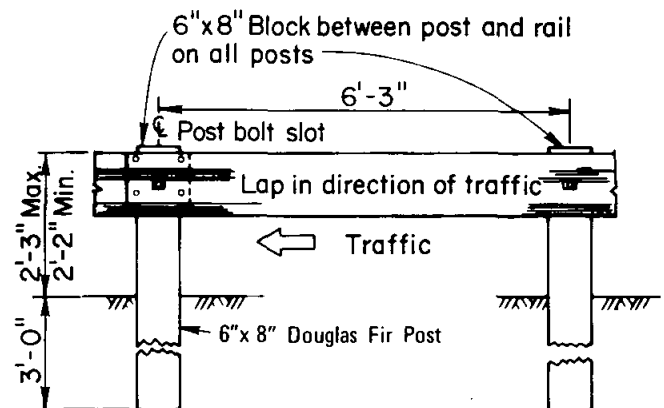
SECTION AT BERM

Post spacing 6'-3" C. to C.

LINE POSTS



PLAN

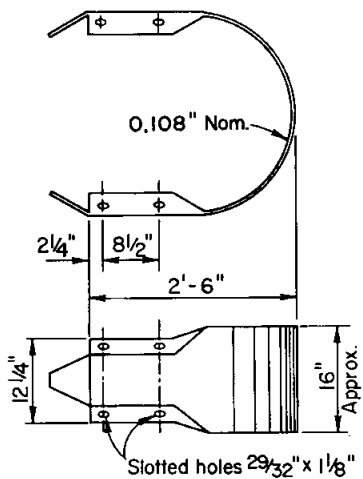


ELEVATION

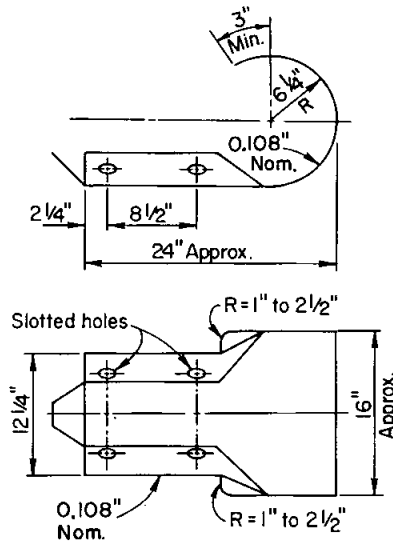
NOTE

See Standard Drawing M-8 for additional details.

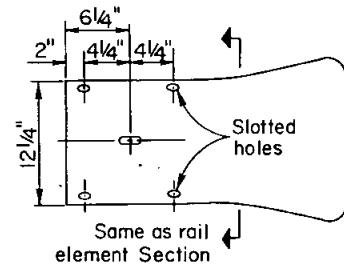
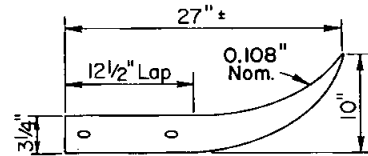
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	
				METAL BEAM GUARD RAIL INSTALLATION	
				RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Allan G. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
				DRAWING NUMBER M-7	



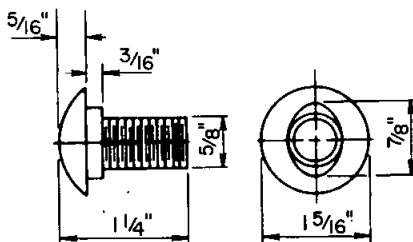
RETURN SECTION



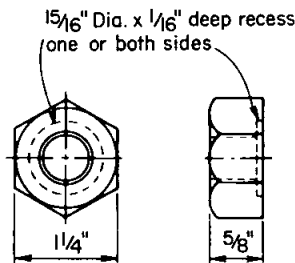
**TERMINAL SECTION
TYPE "A"**



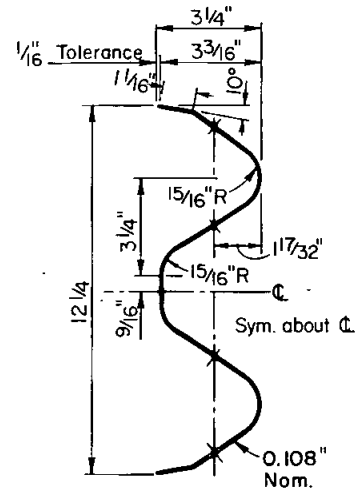
**TERMINAL SECTION
TYPE "B"**



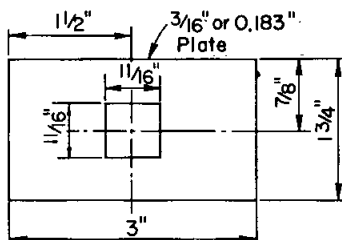
5/8" Ø BUTTON HEAD BOLT



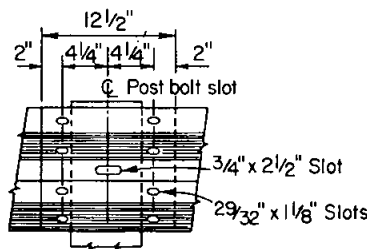
5/8" Ø RECESS NUT



**SECTION THRU
RAIL ELEMENT**



FLAT PLATE WASHER



5/8" x 1 1/4" Button head oval shoulder bolts with 1 1/4" recessed hex nuts - Total: 8 per splice and 4 per terminal section Lap in direction of traffic.

RAIL SPLICE

NOTES

1. See Standard Drawing M-7 for guard rail installation.
2. All metal elements shall be galvanized.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Oliver A. Kuehnel Dec. 1975
Coordinator R.C.E. 15807 Date

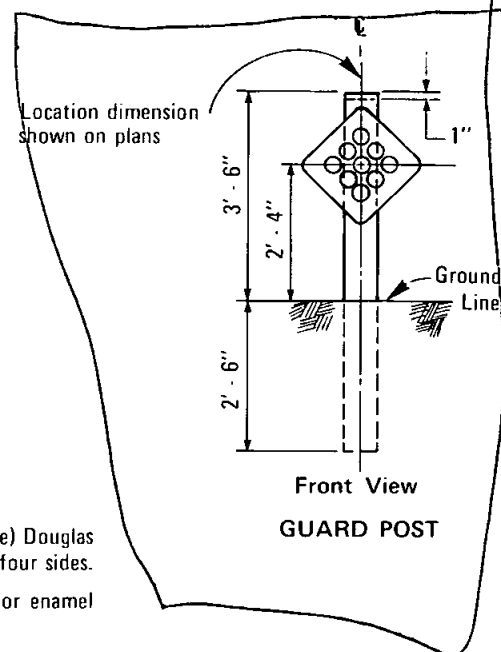
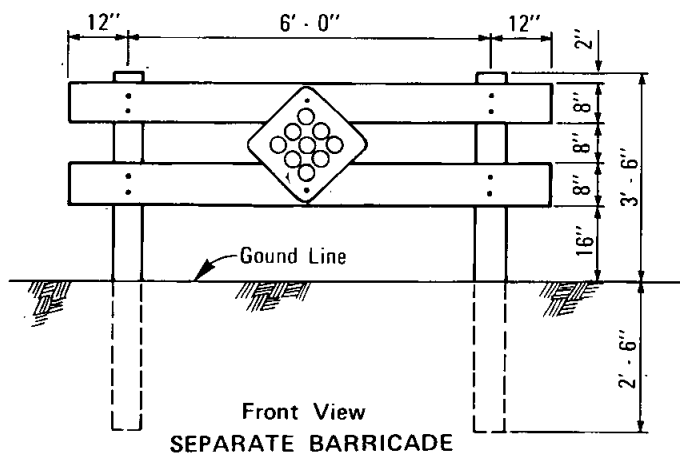
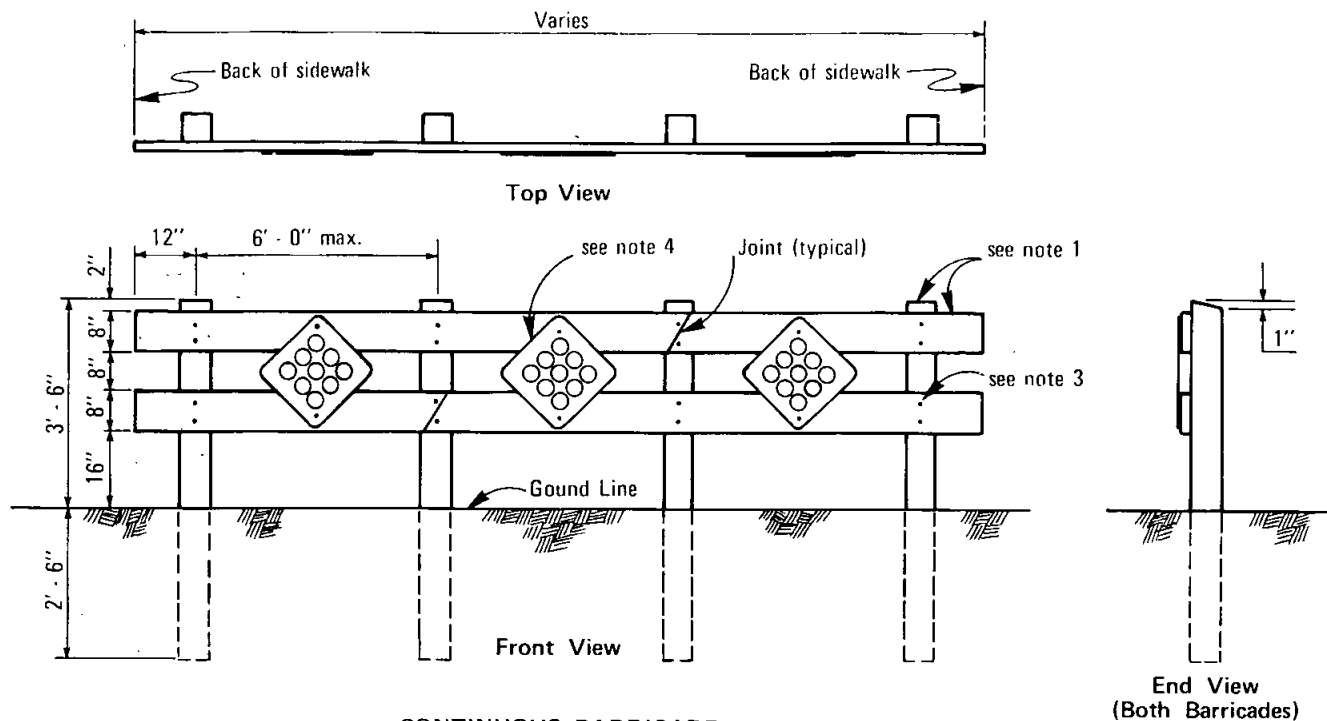
DRAWING
NUMBER

M-8

SAN DIEGO REGIONAL STANDARD DRAWING

**METAL BEAM GUARD RAIL
DETAILS**

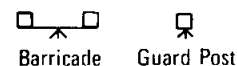
Revision	By	Approved	Date



NOTES

1. Posts to be 6" x 6", structural grade redwood or pressure treated (with wood preservative) Douglas Fir, surfaced four sides; cross pieces to be 2" x 8" select grade Douglas Fir, surfaced four sides.
2. All exposed portions of barricades shall be painted with two coats of white exterior enamel over prime coat.
3. Connections shall be made with 3/8" x 6" galvanized lag screws with one (1) washer each. Reflector sign fasteners to be 3/8" x 1 1/2" galvanized lag screws.
4. Reflector signs - California Type N. Size 18" x 18" - Yellow with nine (9) - 3 1/4" reflectors (center mount).
 - a. Reflectors shall be red for use on dead end streets, in all other cases they shall be yellow. Reflector material shall be plastic or other approved reflectorized material.
 - b. Sign material shall be aluminum alloy 6061-T6 or 5052-H38, minimum thickness 0.063 inches.

LEGEND ON PLANS



Revision	By	Approved	Date
Cont. Barric.	D.S.	7-79	

SAN DIEGO REGIONAL STANDARD DRAWING

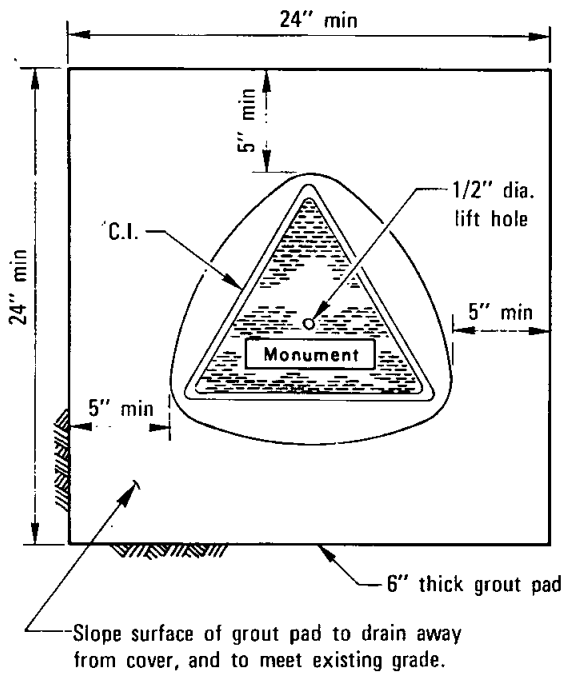
GUARD POST AND BARRICADE

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

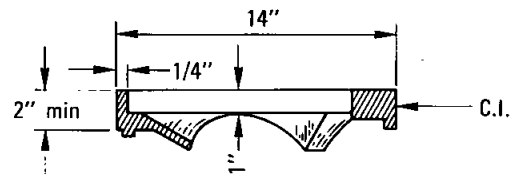
Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER

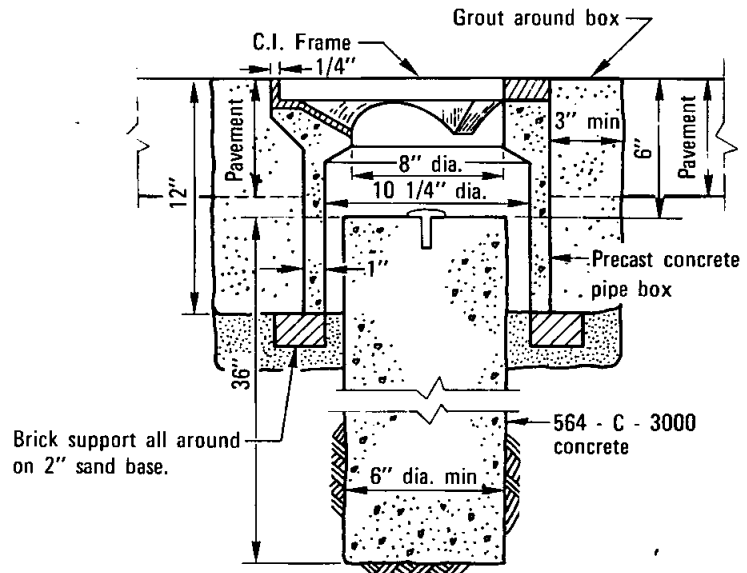
M-9



PLAN-IN UNPAVED AREA



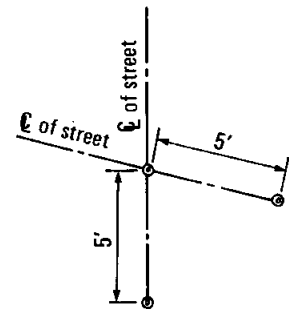
RISER RING



TYPICAL MONUMENT SECTION IN PAVED AREA

NOTES

1. Cover and frame to be cast integrally with pipe box.
2. Monument base may be cast in place or precast.
3. Form and taper exposed upper 6" of cast in place base to a top diameter of 5". (Precast base shall be sand backfilled).
4. Monument marker shall be a domed brass, 3" in diameter.
5. Monument Location:
 - a) Set on all centerline intersections unless actual location is modified by the Agency and shown in modified location on map. When centerline intersection is impractical, offset 5 feet on centerline of major street, (see detail at right). If neither centerline can be occupied, two monuments will be set in line around the front on the perimeter of a 10-foot diameter circle, whose center is the point.
 - b) Set on centerline at intervals not exceeding 1000 feet on straight runs.
 - c) Set on centerline at points of curvature.
 - d) Set on center at center points of cul-de-sacs.
 - e) Set on centerline when center point of cul-de-sac is offset from centerline.
 - f) These standards may be modified at the discretion of the Agency in cases where strict compliance there-with results in more monuments than it considers necessary. The following technique for reducing the number of monuments will be routine.
 - g) Substitution of one monument on the "Point of Intersection" for monuments at the "Beginning of Curve" and the "Ending of Curve" when the "Point of Intersection" falls within the pavement area.
 - h) Deletion of any monument otherwise required by these standards when its position can be determined by turning one angle from a point on a straight line between two other monuments, providing such point is not more than 300 feet from the point on which the deleted monument would have been placed.



Alternate location of monument. Tie distances shown on final subdivision map if alternate location is used.

LOCATION OF STREET SURVEY MONUMENT

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

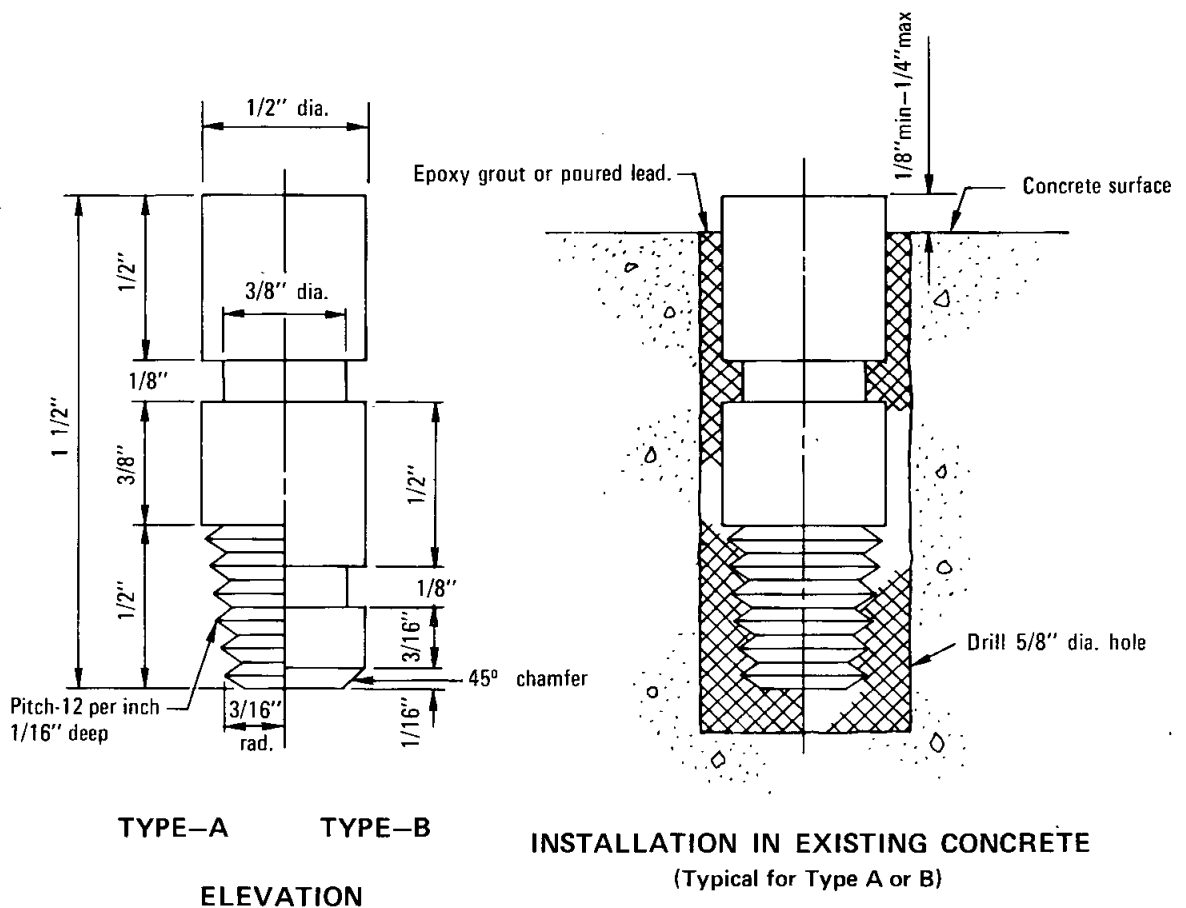
Allen A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING NUMBER M-10

SAN DIEGO REGIONAL STANDARD DRAWING

STREET SURVEY MONUMENT

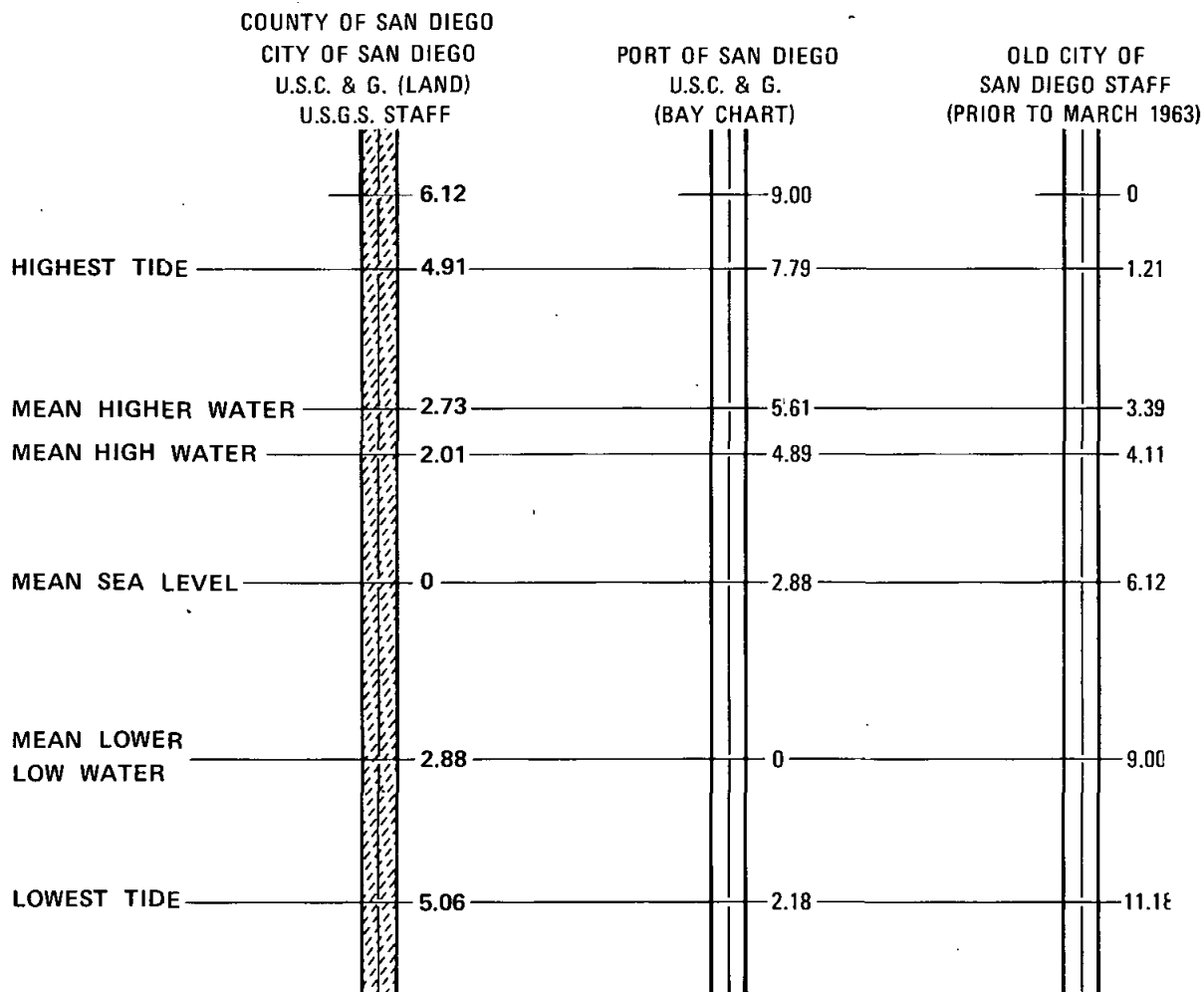
Revision	By	Approved	Date
Notes	SC	D. S.	7-79



NOTES

1. Material - Brass A.S.T.M. B-16. All machine tolerances 1/64"±, machine finish.
2. May be installed in fresh concrete at time of installation of concrete structure.
3. Location—in most stable, permanent location in vicinity, such as in base for street light standard or traffic signal (behind sidewalk), in curb (not near joint, on curve or near trees), on top of drainage headwall, in foundation for building or retaining wall or in concrete pads for transformers, pump stations etc.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				BENCH MARK - BRASS PLUG		<i>Allard A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	M-11



LEGEND

U.S.C. & G.

U.S.G.S.

MEAN HIGH WATER

MEAN HIGHER WATER

= United States Coast and Geodetic Survey.

= United States Geological Survey.

= Mean of all high water in San Diego Bay.

= Mean of all higher water in San Diego Bay.
Bay charts and topography up to the mean
high tide based on zero at the mean lower
low water.

SOURCE

Data based on U.S.C. & G. "Sea Level Datum of 1929".

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

DATUMS

DRAWING
NUMBER

M-12

Revision	By	Approved	Date

FOUND MONUMENTS

Found monuments must denote the character of the monument, how it is identified and the record, or no record as applicable.

SET MONUMENTS - Criteria for Locating and Character

On subdivision boundaries, permanent monuments are required; and must be shown on the map at intervals as specified by the local agency. The location of such points that are unacceptable or will be destroyed by construction may be established by ties to permanent reference monuments shown on the final map.

A permanent monument shall be no less substantial than the following:

a. An iron pipe of minimum two inch diameter not less than two feet in length placed upright in the ground so that the top of said pipe is flush with the surface. Said pipe shall be filled with a metal or cement plug at least three inches in depth and centered with a metal tack and disc; or

b. A metal plug with tack and disc set flush with the surface in portland cement concrete sidewalk, curb or pavement; or other monument satisfactory to the City Engineer or County Surveyor.

Lot corners and points of curves along street and alley right of way lines where portland cement concrete sidewalks, curbs or pavement exist, or will be constructed as part of the subdivision requirements, shall be identified with tack and disc set flush with the surface along an extension of the lot line at an approved offset, to be measured radially or at right angles to the right of way line in said sidewalk, curb or pavement. In case the sideline of the lot is not radial or at right angles to the right of way line a disc shall be set along an extension of the sideline at an offset to be measured radially or at right angles to the right of way line. Where no such concrete work exists, and none will be required to be constructed, all lot corners, angle points and points of curve shall be marked with a monument no less substantial than a one-half inch steel rod or pipe, 18 inches long, set flush with the surface.

LEGEND

● Fd 2" Iron Pipe Marked RCE XXXX or per Map XXX unless otherwise noted

■ Fd Street Survey Monument Stamped RCE XXXX or LS XXXX

○ Set 2" x 24" Iron Pipe Marked RCE XXXX or LS XXXX

□ Set Lead and Disc Stamped RCE XXXX or LS XXXX

○ Set ½" x 18" Iron Pipe Marked RCE XXXX or LS XXXX

□ Set Street Survey Monument Stamped RCE XXXX or LS XXXX per Standard Drawing M-10

The addition of other symbols is permissible where such will result in a clearer map.

The following notes should be used in the legend where applicable.

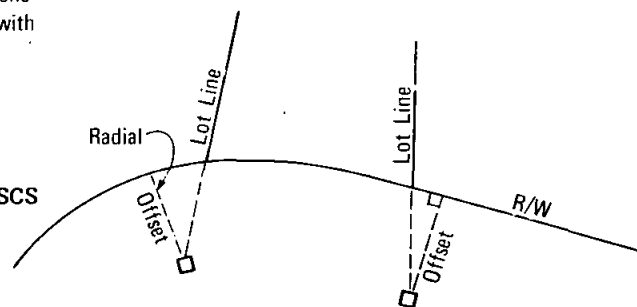
Unless otherwise shown on this map:

1. All lot corners except as described below will be monumented by a ½ inch by 18 inch iron pin stamped (RCE or LS number).

2. Lot corners along the sideline of dedicated street right of way will be monumented by a disc stamped (RCE or LS number), set along an extension of the lot line at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially, or at right angles, to the right of way line. (See example below.)

3. All points of curve of the sidelines of dedicated streets will be monumented by a disc stamped (RCE or LS number), set at an offset of ___ in the (curb, sidewalk). The offset shall be measured radially.

EXAMPLE OF OFFSET DISCS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Notes	JC	D.S.	7.79			
				SURVEY MONUMENTS		<i>Allard A. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
				DRAWING NUMBER		M-13

1 Gram = 15.4324 grains
 1 Gram = 0.0353 oz.
 1 Kg. = 2.2046 lb.
 1 Kg. = 0.0011 ton
 1 Ton (met) = 1.1023 ton

WEIGHT

1 Grain = 0.0648 g.
 1 Ounce = 28.3495 g.
 1 Pound = 0.4536 kg.
 1 Ton = 907.1848 kg.
 1 Ton = 0.9072 ton (met)

1 Sq. cm. = 0.1550 sq. in.
 1 Sq. m. = 10.7639 sq. ft.
 1 Sq. m. = 1.1960 sq. yd.
 1 Hectare = 2.4710 acres
 1 Sq. km. = 0.3861 sq. mile
 1 Sq. km. = 247.10 acres

AREA

1 Sq. in. = 6.4516 sq. cm.
 1 Sq. ft. = 0.0929 sq. m.
 1 Sq. yd. = 0.8361 sq. m.
 1 Acre = 0.4047 hectare
 1 Sq. mile = 2.5900 sq. km.
 1 Acre = 0.0040 sq. km.

1 Cu. cm. = 0.0610 cu. in.
 1 Cu. m. = 35.3134 cu. ft.
 1 Cu. m. = 1.3079 cu. yd.

VOLUME

1 Cu. in. = 16.3872 cu. cm.
 1 Cu. ft. = 0.0283 cu. m.
 1 Cu. yd. = 0.7646 cu. m.

1 Liter = 61.0250 cu. in.
 1 Liter = 0.0353 cu. ft.
 1 Liter = 0.2642 gal. (U.S.)
 1 Liter = 0.0284 bu. (U.S.)

CAPACITY

1 Cu. in. = 0.0164 liter
 1 Cu. ft. = 28.3162 liters
 1 Gal. = 3.7853 liters
 1 Bu. = 35.2383 liters

1 MM. = 0.0394 in.
 1 CM. = 0.3937 in.
 1 Meter = 3.2808 ft.
 1 Meter = 1.0936 yd.
 1 Km. = 0.6214 mile

LENGTH

1 In. = 25.4000 mm.
 1 In. = 2.5400 cm.
 1 Ft. = 0.3048 m.
 1 Yd. = 0.9144 m.
 1 Mile = 1.6093 km.

MULTIPLE PREFIX
 1000000 mega
 1000 kilo
 100 hecto
 10 deka

METRIC PREFIX

MULTIPLE PREFIX
 1/10 deci
 1/100 centi
 1/1000 milli
 1/1000000 micro

TEMPERATURE

Degrees Fahrenheit = $9/5$ (Degrees Celcius) + 32

Degrees Centigrade = $5/9$ (Degrees Fahrenheit - 32)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn Dec. 1975
Coordinator H.C.E. 19807 Date

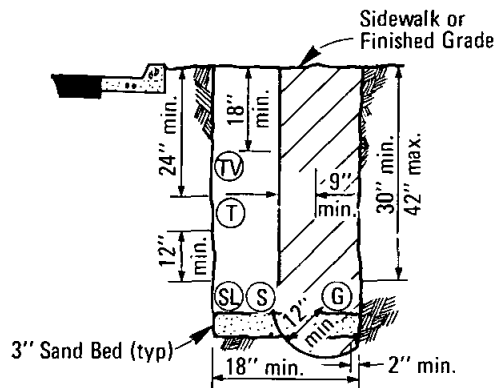
DRAWING
NUMBER

M-14

SAN DIEGO REGIONAL STANDARD DRAWING

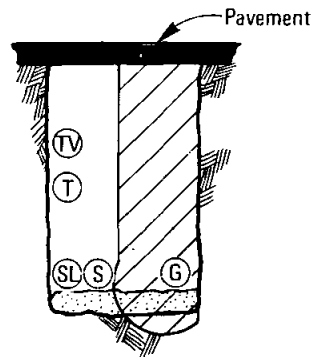
METRIC EQUIVALENTS

Revision	By	Approved	Date
Equation	SC	D.S.	7-79

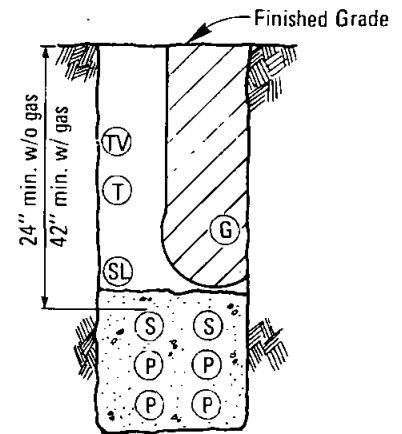


TYPE A (No Sidewalk)

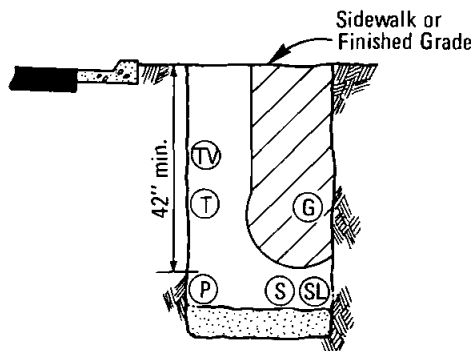
TYPE B (Sidewalk)



TYPE C

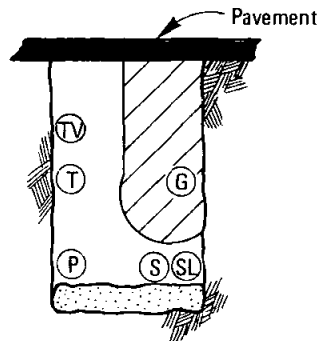


TYPE G
(Concrete Encased)



TYPE D (No Sidewalk)

TYPE E (Sidewalk)



TYPE F

LEGEND

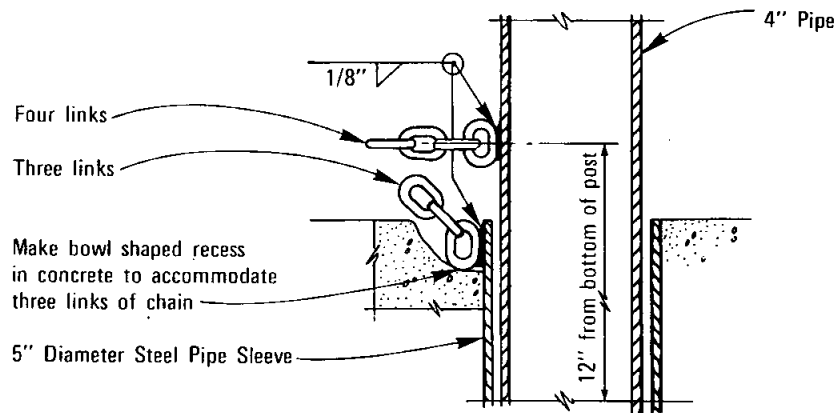
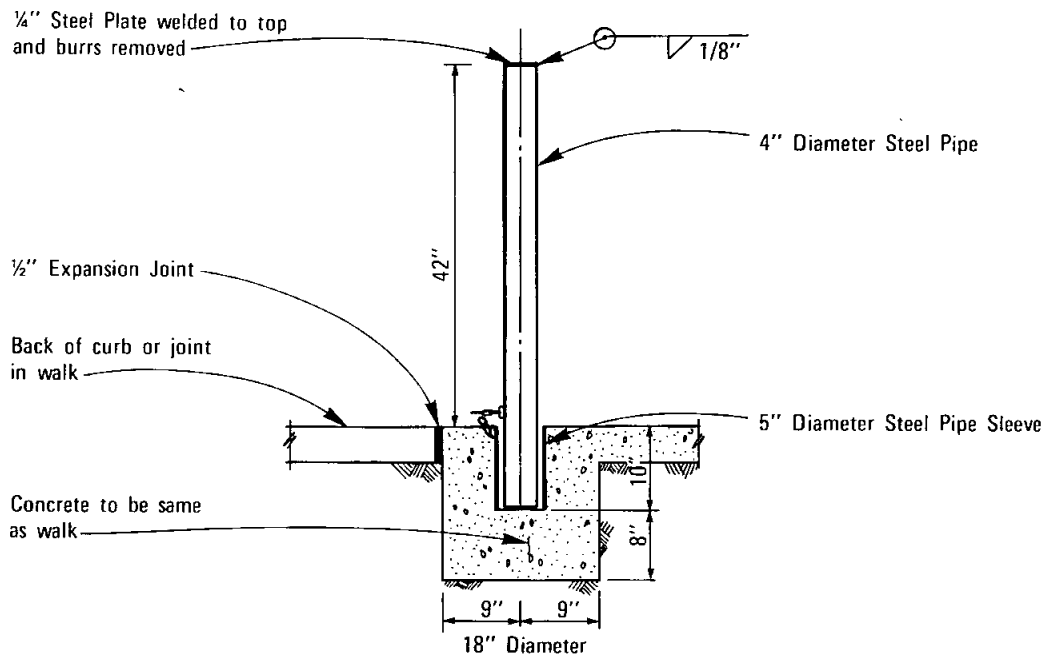
- (G) Gas Main
- (P) Primary Electric
- (S) Secondary Electric
- (T) Telephone
- (SL) Street Light Conduit
- (TV) Television Conduit
- Clear Zone

All dimensions are typical unless otherwise noted.

NOTES

1. Generally utilities are to be installed under the applicable specifications for the particular utility and the specifications of the owner Agency.
2. The location of utilities as shown by the Standard Drawing shall in no way violate existing codes or regulations applicable to individual utilities.
3. Gas main to be placed on property side of trench. Electric primary should be diagonally opposite gas main where possible (Types D, E and F).
4. Installation of sewer and/or water utilities are not permitted in the joint trench shown above.
5. Minimum depth of gas pipe may, subject to gas company inspectors approval, be reduced to 24" where necessary to clear foreign structure crossings.
6. Depth and width of trench varies.
7. When approved by all utilities concerned secondary electric, telephone and CATV may be concurrently installed with random separation.
8. CATV main or trunk line conduit required along all streets, except cul-de-sac streets less than 2500' in length which may be served by feeder lines only.
9. CATV 1 1/2" feeder conduit shall run across streets with each power service line and capped at edge of sidewalk.
10. All CATV terminals and conduits shall be terminated at generally accepted locations and marked. A map shall be filed with the appropriate agency showing the location of the CATV system.
11. In no case shall CATV conduits be placed within 12" of electric or gas lines. Also conduits are not to be placed directly over gas lines.
12. CATV conduit may be placed with the TELCO conduit provided the TELCO minimum depth is held.
13. Types A, B and C apply when an electric secondary conduit only is used. Types D, E and F apply when an electric primary (and secondary) conduit is used.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
St. Light	SC	D. S.	7-79				
				JOINT TRENCH UTILITIES LOCATION		<i>Albert A. Kerschbaum</i> Dec. 1975 Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						M-15	



HASP DETAIL
(Showing Welds)

NOTES

1. Chain to be 1/4" proof coil chain galvanized steel. Weld four links to post and three links to pipe sleeve.
2. All metal to be hot-dip galvanized after fabrication.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

David J. Solomon *July 1979*
Coordinator R.C.E. 25291 Date

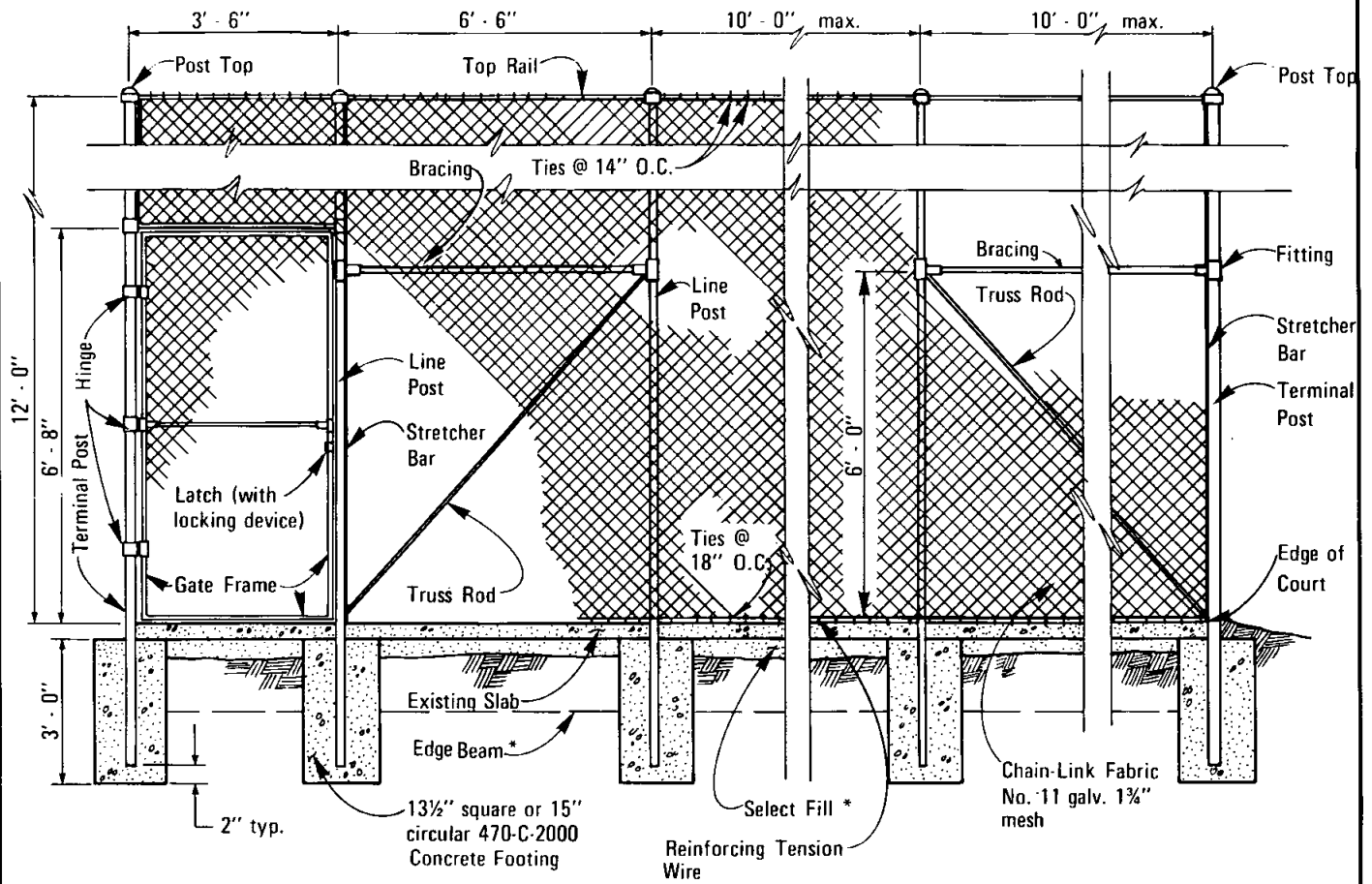
SAN DIEGO REGIONAL STANDARD DRAWING

DEMOUNTABLE POST

DRAWING
NUMBER

M-16

Revision	By	Approved	Date



*For Edge Beam, Slab, and Select Fill details, see plans.

ELEVATION

NOTE

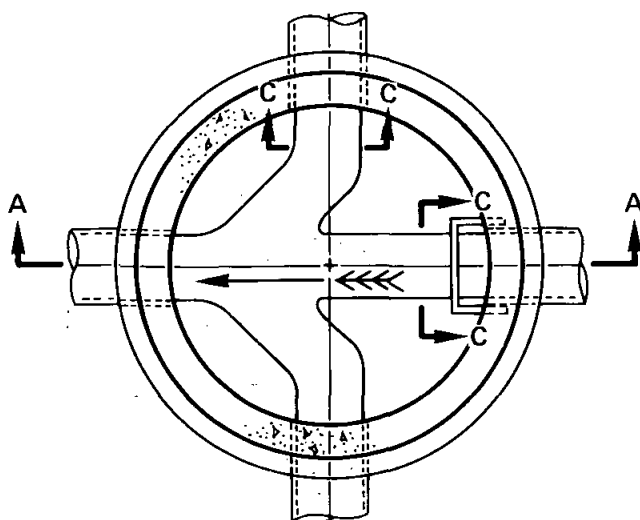
Chain-link fabric shall be erected on the interior side of the courts.

CAUTION: This standard is not to be used if any wind screen is to be applied to the fence.

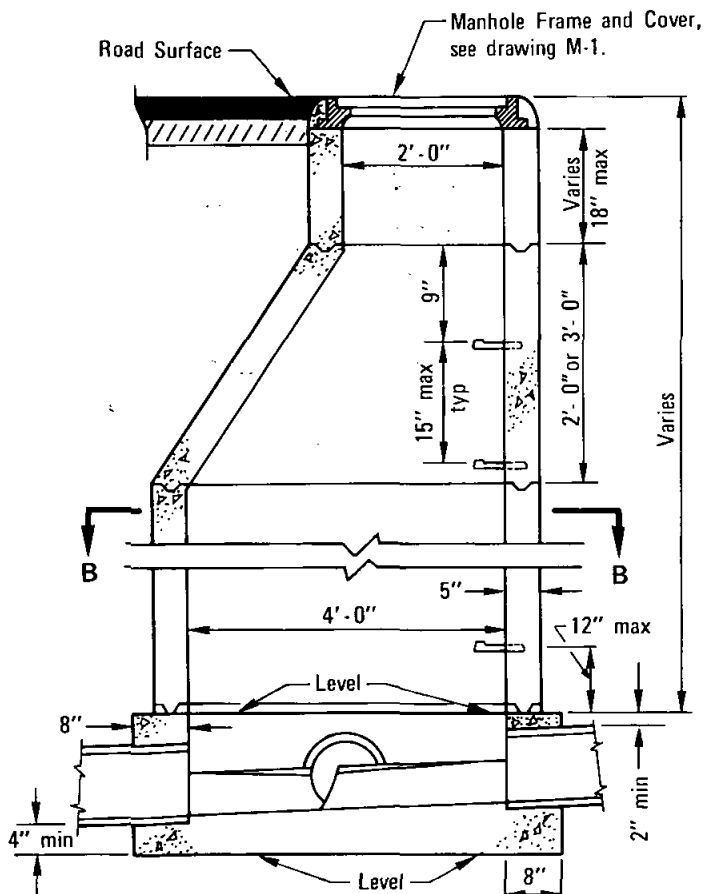
DESCRIPTION	MIN. SIZE IN INCHES	MIN. WEIGHT PER LIN FT IN LBS
Line Post	2.375 O.D.	3.65
Terminal Post	2.875 O.D.	5.79
Top Rail	1.660 O.D.	2.27
Bracing	1.660 O.D.	2.27
Gate Frame	1.660 O.D.	2.27

Revision	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING TENNIS COURT FENCE CHAIN - LINK	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE <i>Randy L. Salomon</i> July 1979 Coordinator R.C.E. 25291 Date
DRAWING NUMBER			M-17	

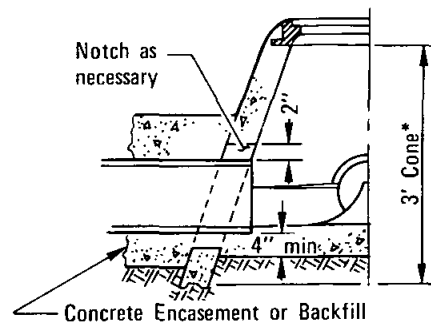
SEWERAGE SYSTEMS



SECTION B-B

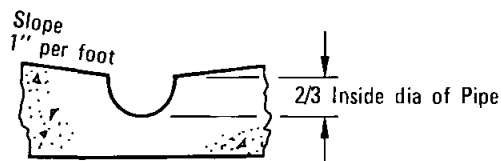


SECTION A-A

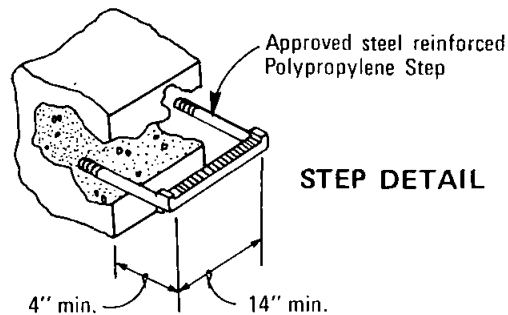


HALF SECTION SHALLOW MANHOLE

* Either Concentric or Eccentric Cone may be used.



SECTION C-C



STEP DETAIL

NOTES

1. Manhole frame and all joints shall be set in Class "C" mortar.
2. All precast components shall be manufactured in accordance with ASTM C-478 except step spacing.
3. Vertical wall of cone shall be on the upstream side of the manhole.
4. Concrete base shall be 564-C-3000.
5. Approved water stop required for plastic pipe connections.
6. Flexible pipe joints shall be required within 12" of inside face of manhole.
7. Precast base permitted as approved by Agency.

LEGEND ON PLANS

M.H. No. 2

Revision	By	Approved	Date
Step Det.	8	P.S.	7/79

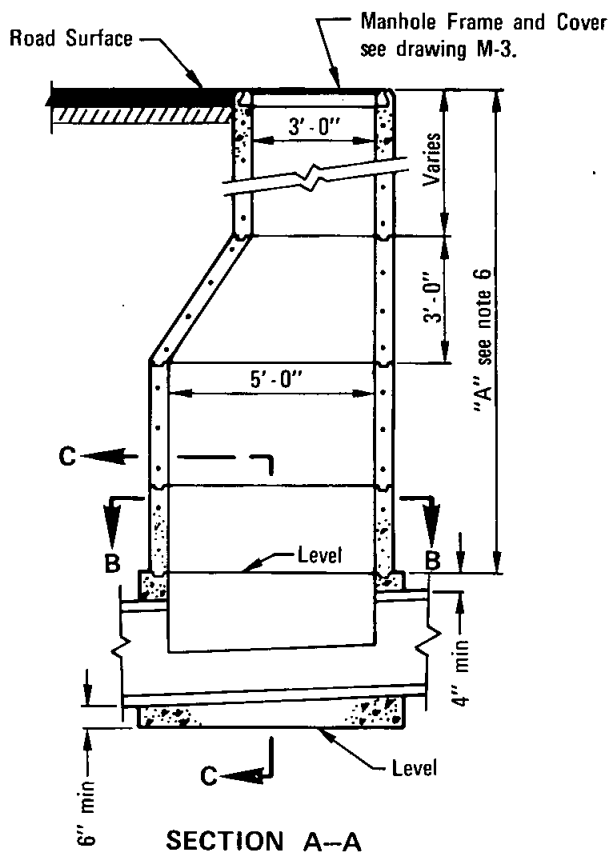
SAN DIEGO REGIONAL STANDARD DRAWING

MANHOLE - 4' x 2' DIAMETER
(FOR 21" MAX. DIA. PIPE)

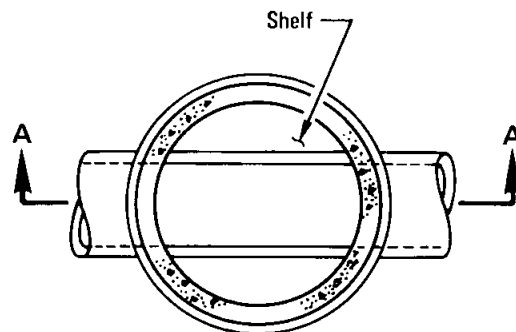
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

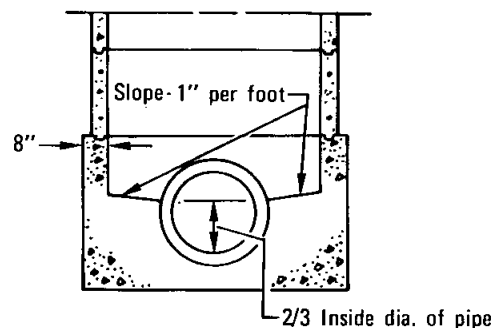
DRAWING
NUMBER S-1



SECTION A-A



SECTION B-B

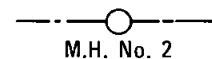


SECTION C-C

NOTES

1. Manhole frame and all joints shall be set in Class "C" mortar.
2. All precast components shall be manufactured in accordance with ASTM C-478.
3. Vertical wall of cone shall be on the upstream side of the manhole.
4. Concrete base shall be 564-C-3000.
5. Approved water stop required for plastic pipe connections.
6. Precast sections shall be used within dimension "A" as required, in order of preference listed:
 - A. Cone (notched for pipe if dimension "A" is less than 3').
 - B. 6" to 24" of 3' diameter grade rings.
 - C. 5' diameter shaft to maximum height of 60".
 - D. Additional 3' diameter risers.
7. Flexible pipe joints shall be required within 12" of inside face of manhole.

LEGEND ON PLANS



M.H. No. 2

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

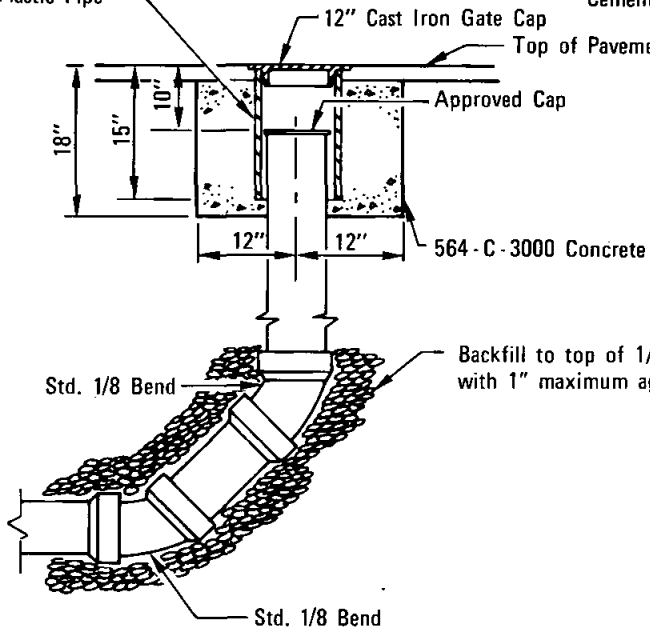
DRAWING
NUMBER **S-2**

SAN DIEGO REGIONAL STANDARD DRAWING

**MANHOLE - 5' DIAMETER
(FOR 24" THROUGH 42" DIA. PIPE)**

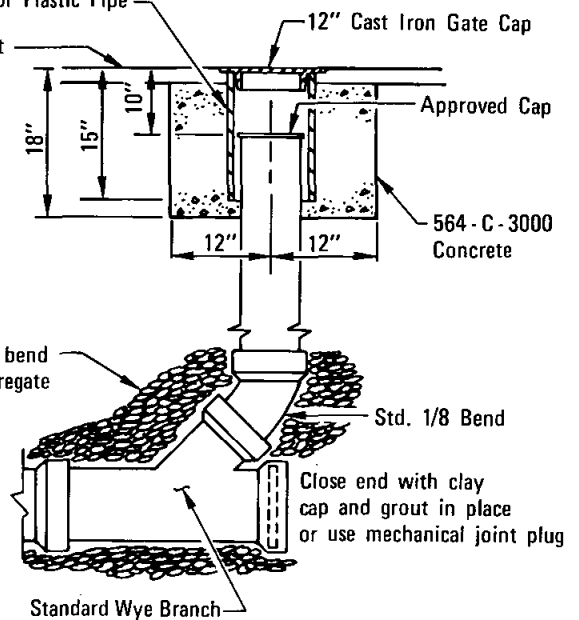
Revision	By	Approved	Date

Section of 12" Metallic, Asbestos
Cement or Plastic Pipe



TYPE A

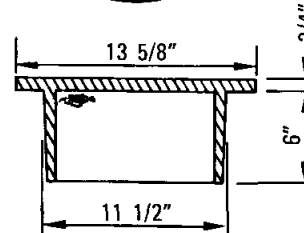
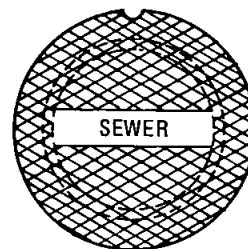
Section of 12" Metallic, Asbestos
Cement or Plastic Pipe



TYPE B

NOTES

1. Gate cap shall be labeled "Sewer".
2. Cleanouts may be used for either V.C.P. or plastic sewer mains.
3. Riser to be same diameter as sewer main.

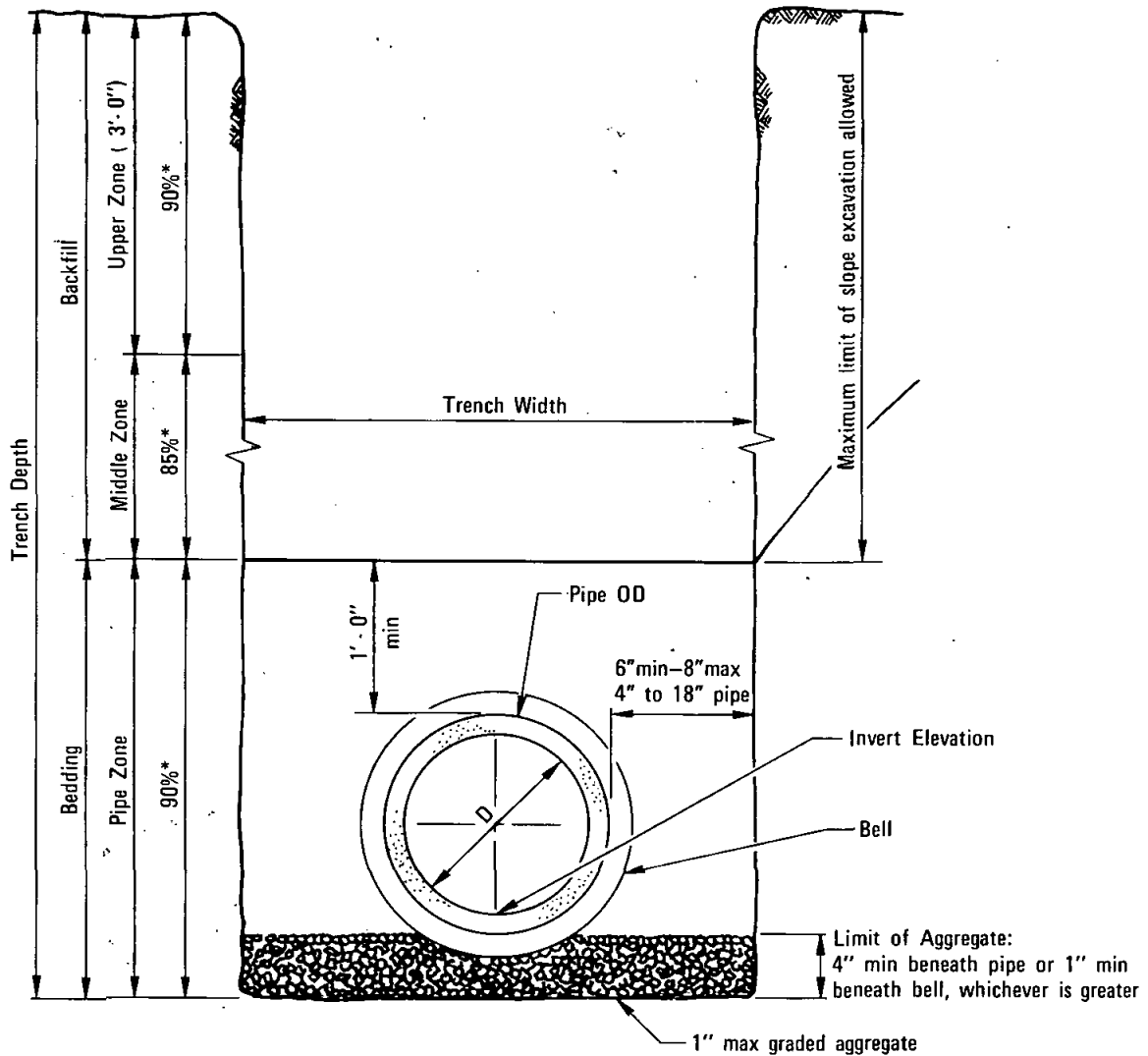


GATE CAP
(Heavy Duty)

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				SEWER MAIN CLEANOUT		<i>Allan A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
							Date
						DRAWING NUMBER	S-3



NOTES

1. For trenching in improved streets, see Standard Drawings G-24 or G-25 for trench resurfacing.
2. (*) indicates minimum relative compaction.
3. Minimum depth of cover from the top of pipe to finish grade for all sanitary sewer installations shall be 3'. For cover less than 3', see Standard Drawing S-7 for concrete encasement.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

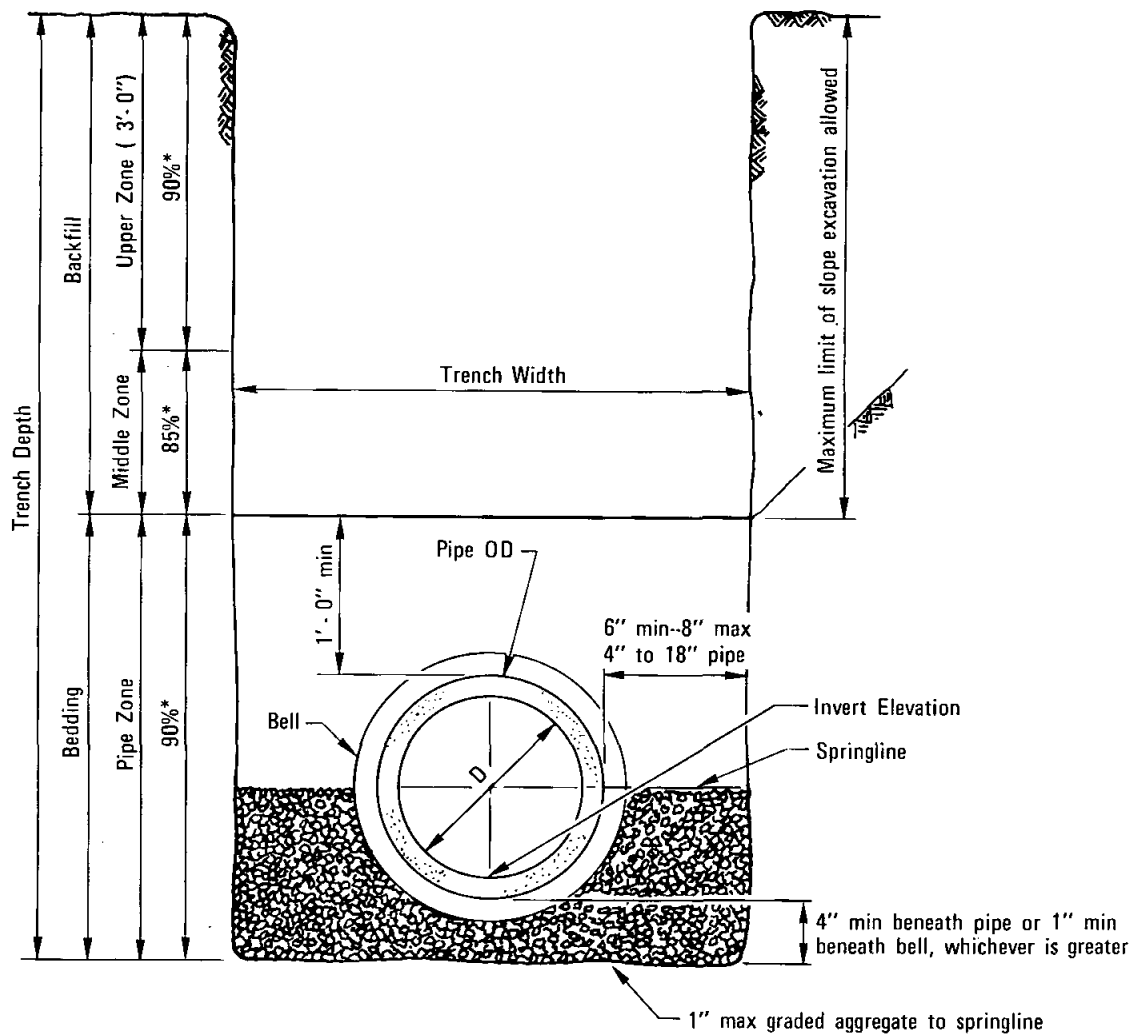
DRAWING
NUMBER

S-4

SAN DIEGO REGIONAL STANDARD DRAWING

PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS (STD. INSTALLATION)

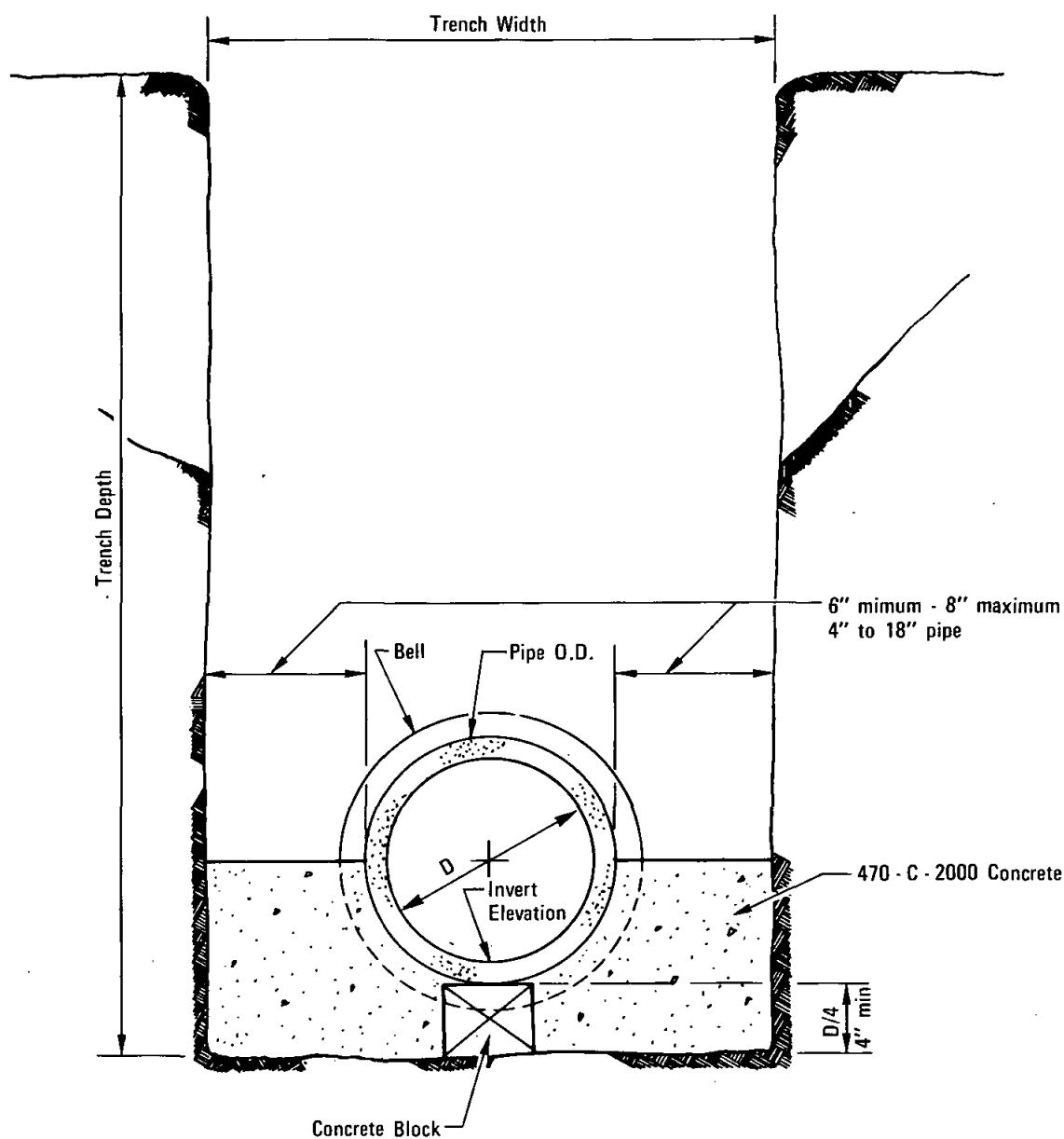
Revision	By	Approved	Date



NOTES

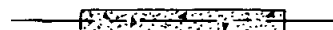
1. For trenching in improved streets, see Standard Drawings G-24 or G-25 for trench resurfacing.
2. (*) indicates minimum relative compaction.
3. Minimum depth of cover from the top of pipe to finish grade for all sanitary sewer installations shall be 3'. For cover less than 3', see Standard Drawing S-7 for concrete encasement.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				PIPE BEDDING AND TRENCH BACKFILL FOR SEWERS (ROCK TO SPRINGLINE)	<i>Allan G. Kuehn</i> Dec. 1975 Coordinator R.C.E. 19807 Date
					DRAWING NUMBER S-5



SECTION

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

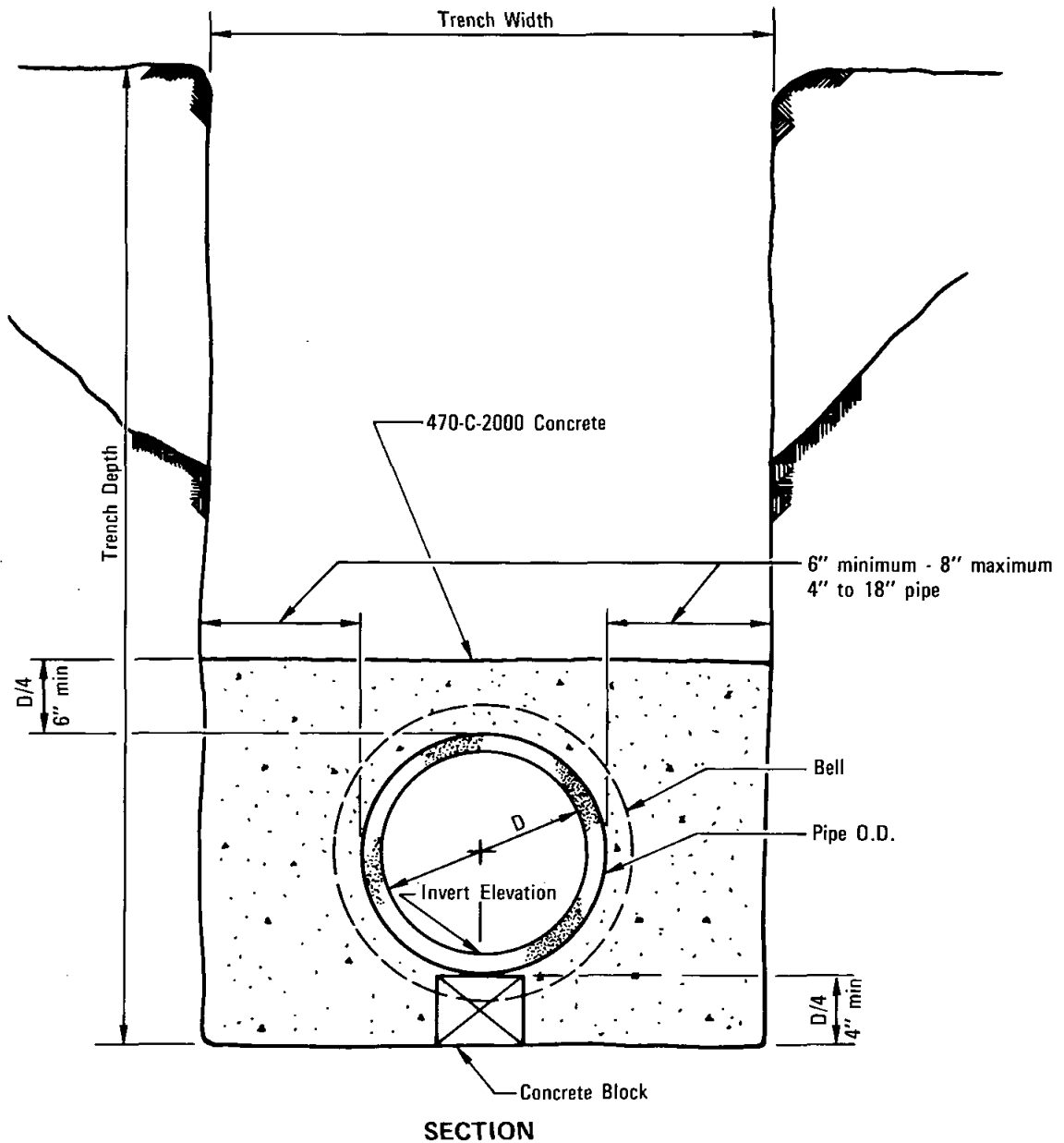
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE CRADLE

Revision	By	Approved	Date

DRAWING
NUMBER

S-6



LEGEND ON PLANS

SEE PLANS FOR
NOTES AND DETAILS

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

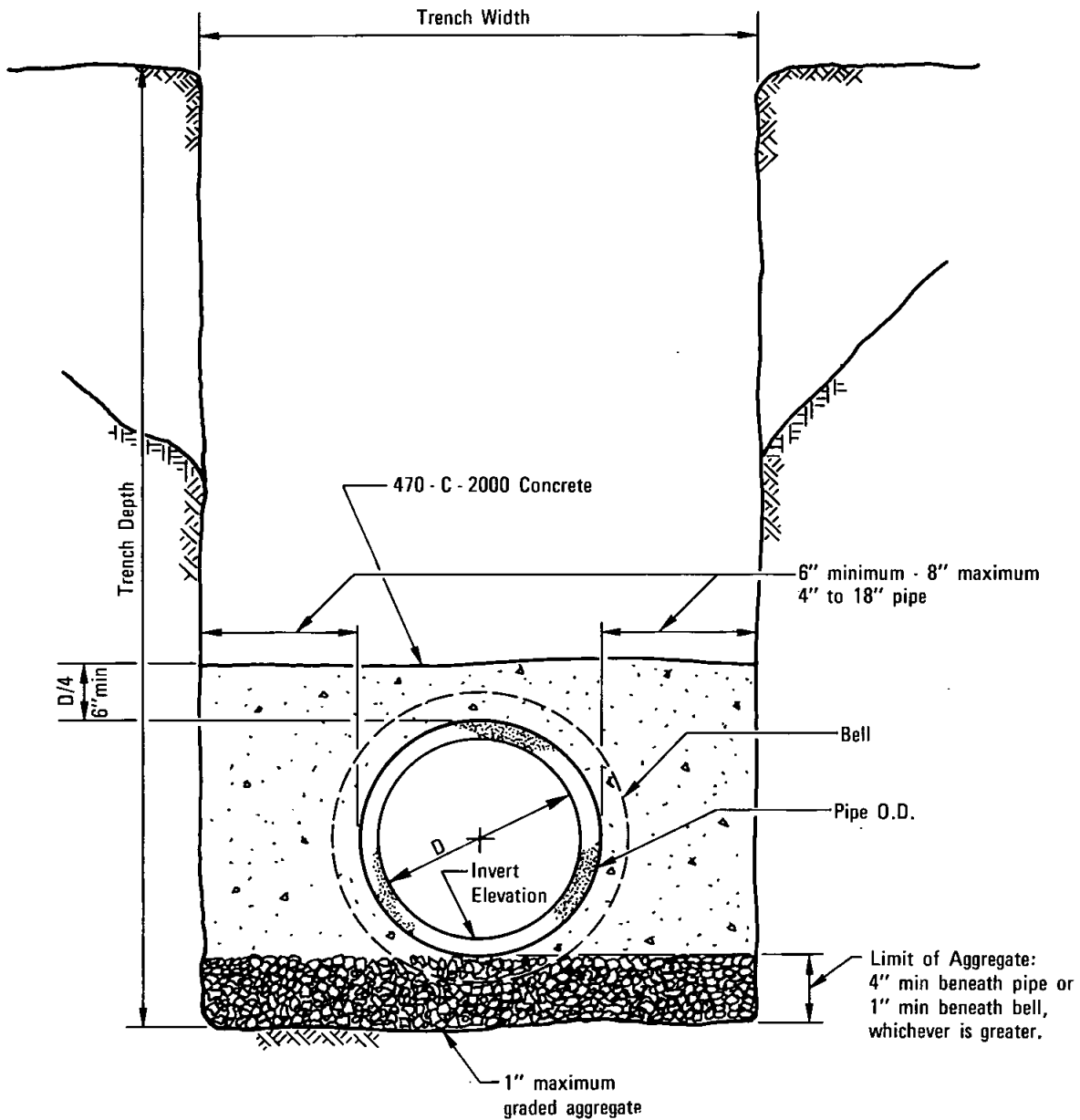
CONCRETE ENCASEMENT

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehnel *Dec. 1975*
Coordinator R.C.E. 15807 Date

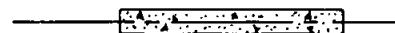
DRAWING
NUMBER

S-7



SECTION

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

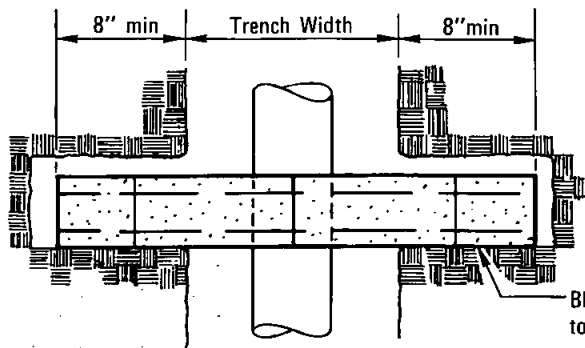
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **S-8**

SAN DIEGO REGIONAL STANDARD DRAWING

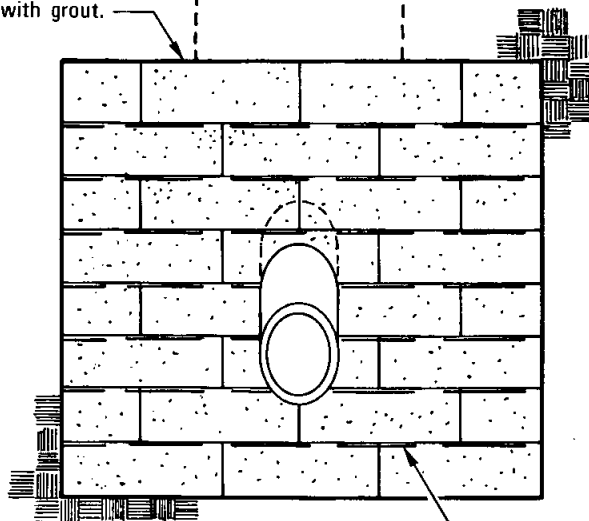
CONCRETE BACKFILL

Revision	By	Approved	Date

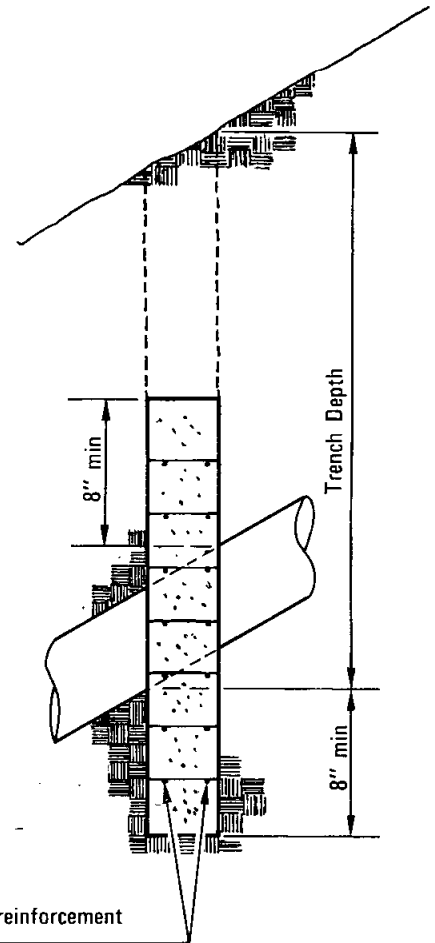


PLAN

470-C-2000 Concrete
or
8" x 8" x 16" concrete block.
Fill cores with grout.

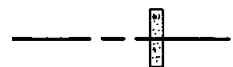


FRONT ELEVATION



SIDE ELEVATION

LEGEND ON PLANS



Revision	By	Approved	Date

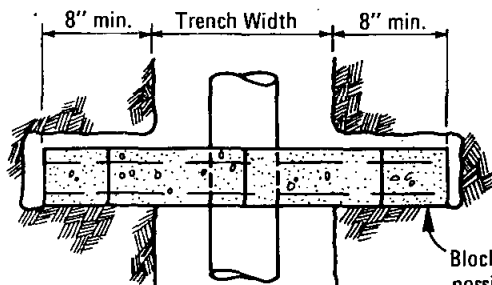
SAN DIEGO REGIONAL STANDARD DRAWING

CONCRETE ANCHOR

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschbaum *Dec. 1975*
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **S-9**

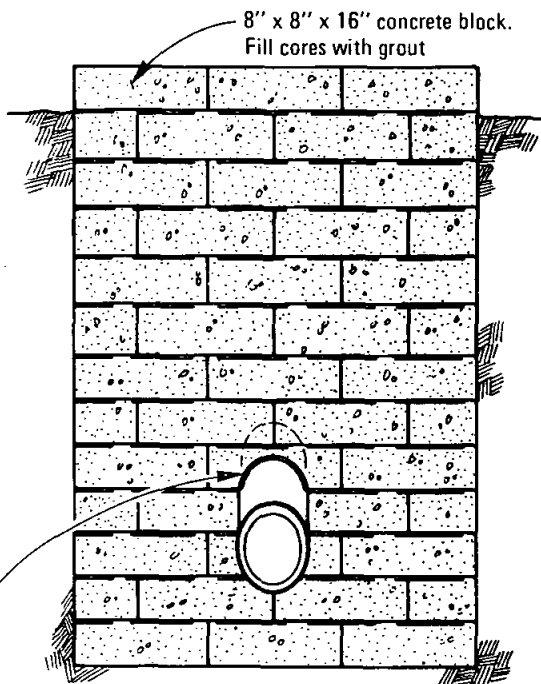


PLAN

NOTES

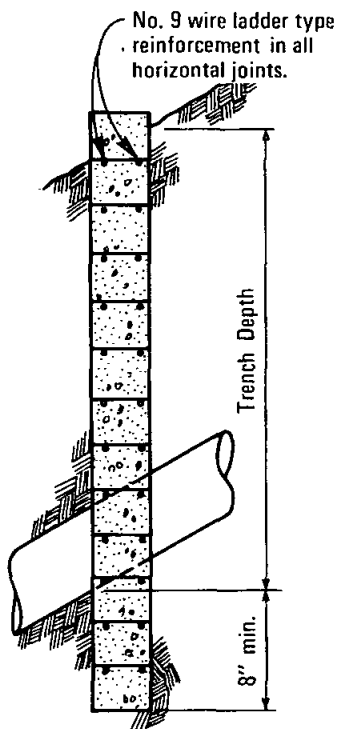
Type B:

1. No vertical joints permitted.
2. Horizontal joints must overlay by 2 corrugations.
3. Corrugations to run horizontally.
4. Alternate material: corrugated fiberglass.
5. Front Elevation and Plan views similar to Type A.



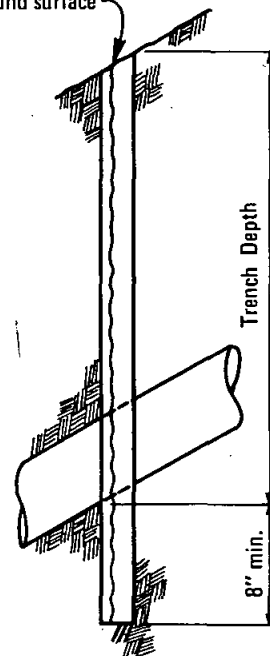
1/2" expansion joint material
or jute around pipe.

FRONT ELEVATION



SIDE ELEVATION

Galvanized Corrugated Sheet Metal
18 Gage or heavier to be laid as tightly
as possible to downstream side of notch.
Make flush with
ground surface

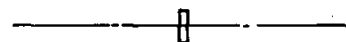


ELEVATION

TYPE A

TYPE B

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuehnel Dec. 1975
Coordinator R.C.L. 19807 Date

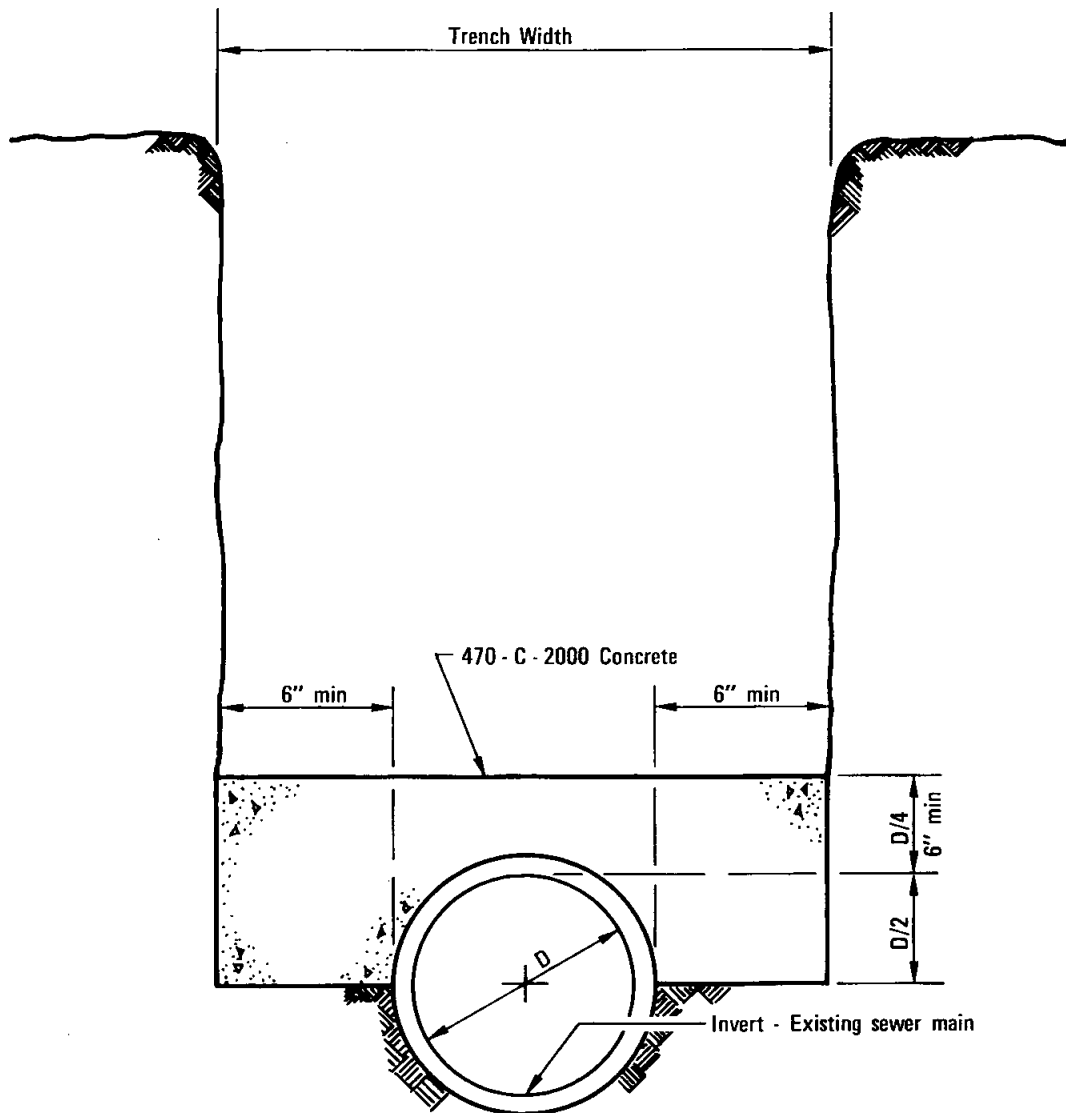
SAN DIEGO REGIONAL STANDARD DRAWING

DRAWING
NUMBER

S-10

CUTOFF WALL

Revision	By	Approved	Date
Type A	<i>SC</i>	<i>D.S.</i>	7.79

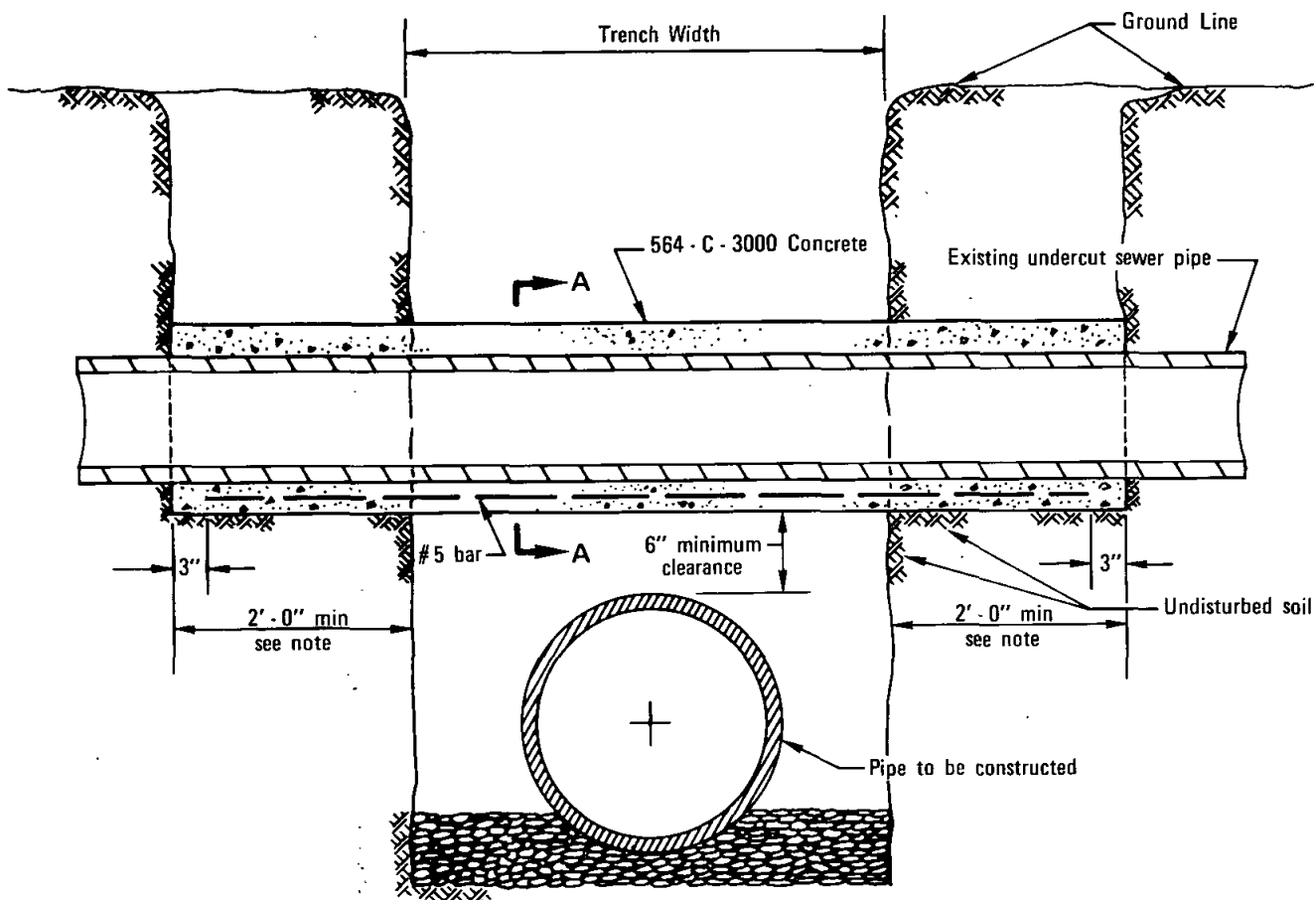


SECTION

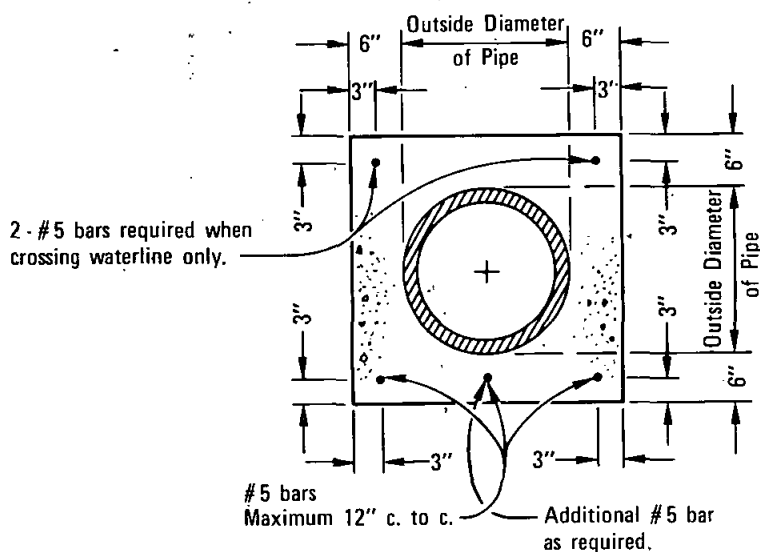
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE PROTECTION FOR EXISTING SEWER PIPE		<i>Allan A. Kerschman</i> <i>Dec. 1975</i>	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						S-11	



TYPICAL SECTION

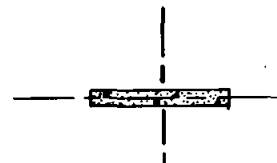


SECTION A-A

NOTE

For water line construction encasement shall extend to first joint beyond 2 feet at both sides of trench or to a distance of 4 feet, whichever is less.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan G. Kershner Dec. 1975
Coordinator R.C.E. 19807 Date

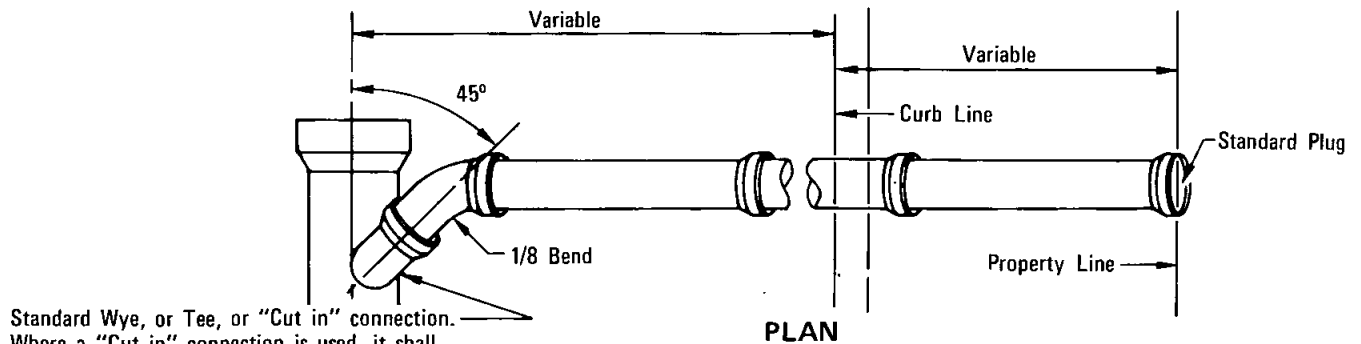
DRAWING
NUMBER

S-12

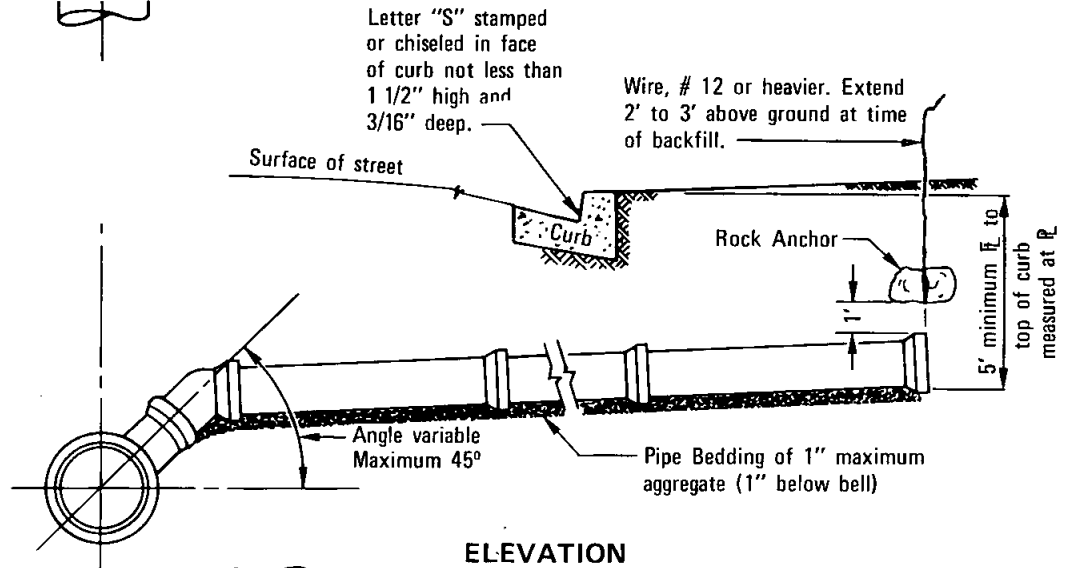
SAN DIEGO REGIONAL STANDARD DRAWING

**CONCRETE SUPPORT
FOR UNDERCUT SEWER PIPE**

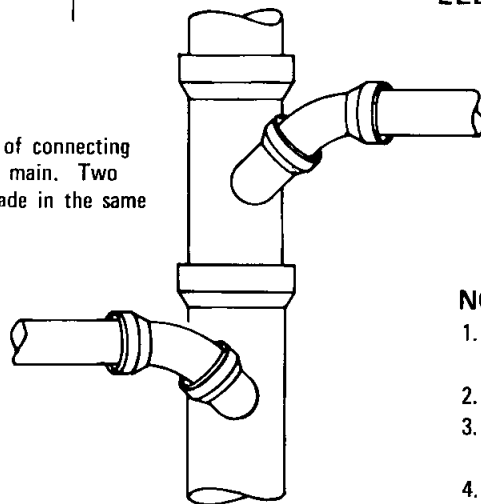
Revision	By	Approved	Date



Standard Wye, or Tee, or "Cut in" connection. Where a "Cut in" connection is used, it shall be surrounded with 4" of Class 470 - C - 2000 Concrete.



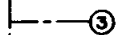
Detail showing the manner of connecting opposite laterals to a sewer main. Two connections shall not be made in the same length of pipe.



NOTES

1. In no case shall a lateral connect to the sewer main directly on top of the pipe.
2. Sewer laterals shall have a minimum slope of 2%.
3. All joints on sewer lateral pipe shall be compression type or approved solvent weld.
4. Lateral shall extend to property line unless otherwise shown on plans.

LEGEND ON PLANS



Revision	By	Approved	Date

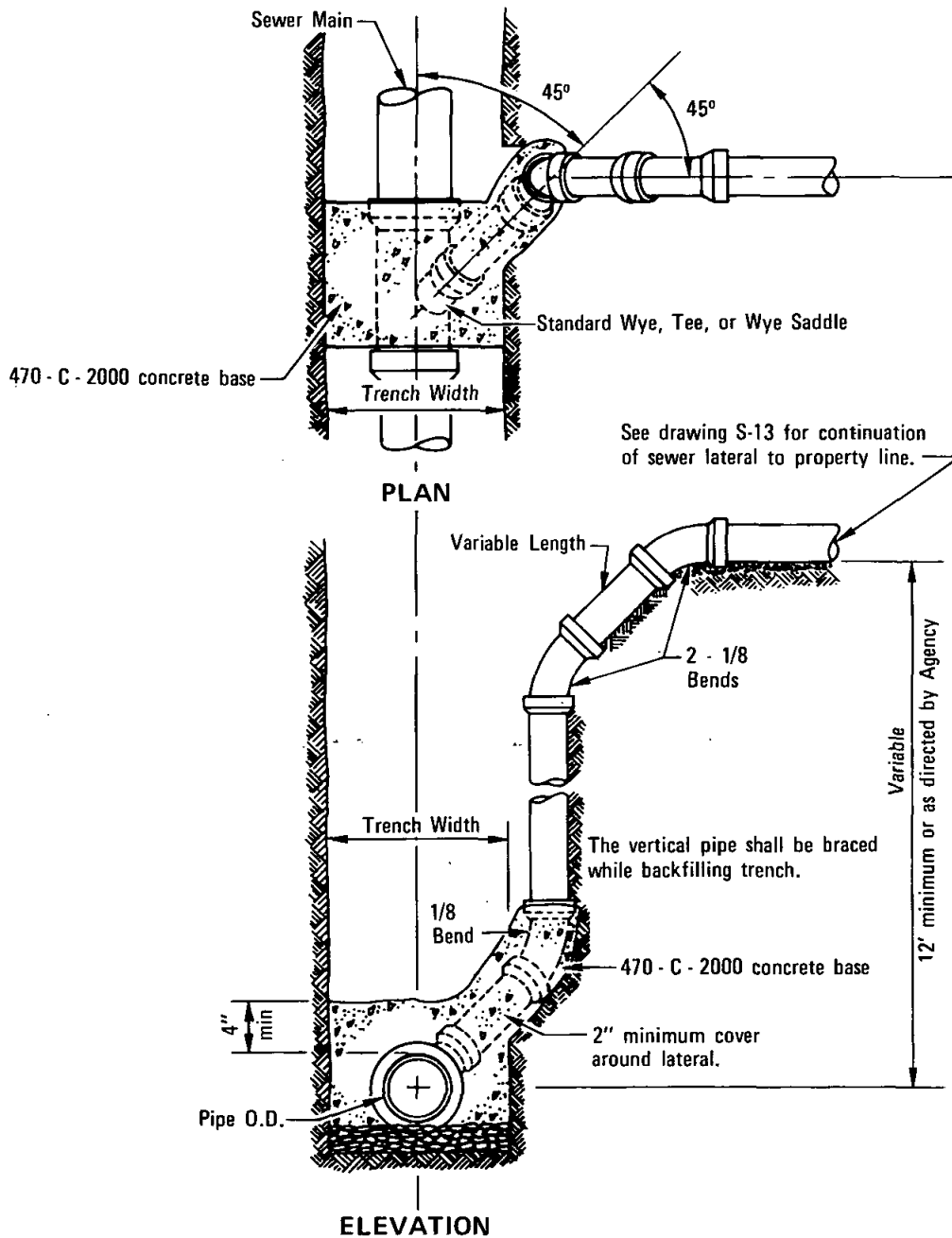
SAN DIEGO REGIONAL STANDARD DRAWING

HOUSE CONNECTION (SEWER LATERAL)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard & Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

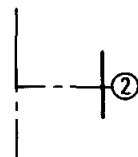
DRAWING
NUMBER **S-13**



NOTE

All joints on sewer lateral pipe shall be compression type or approved solvent weld.

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

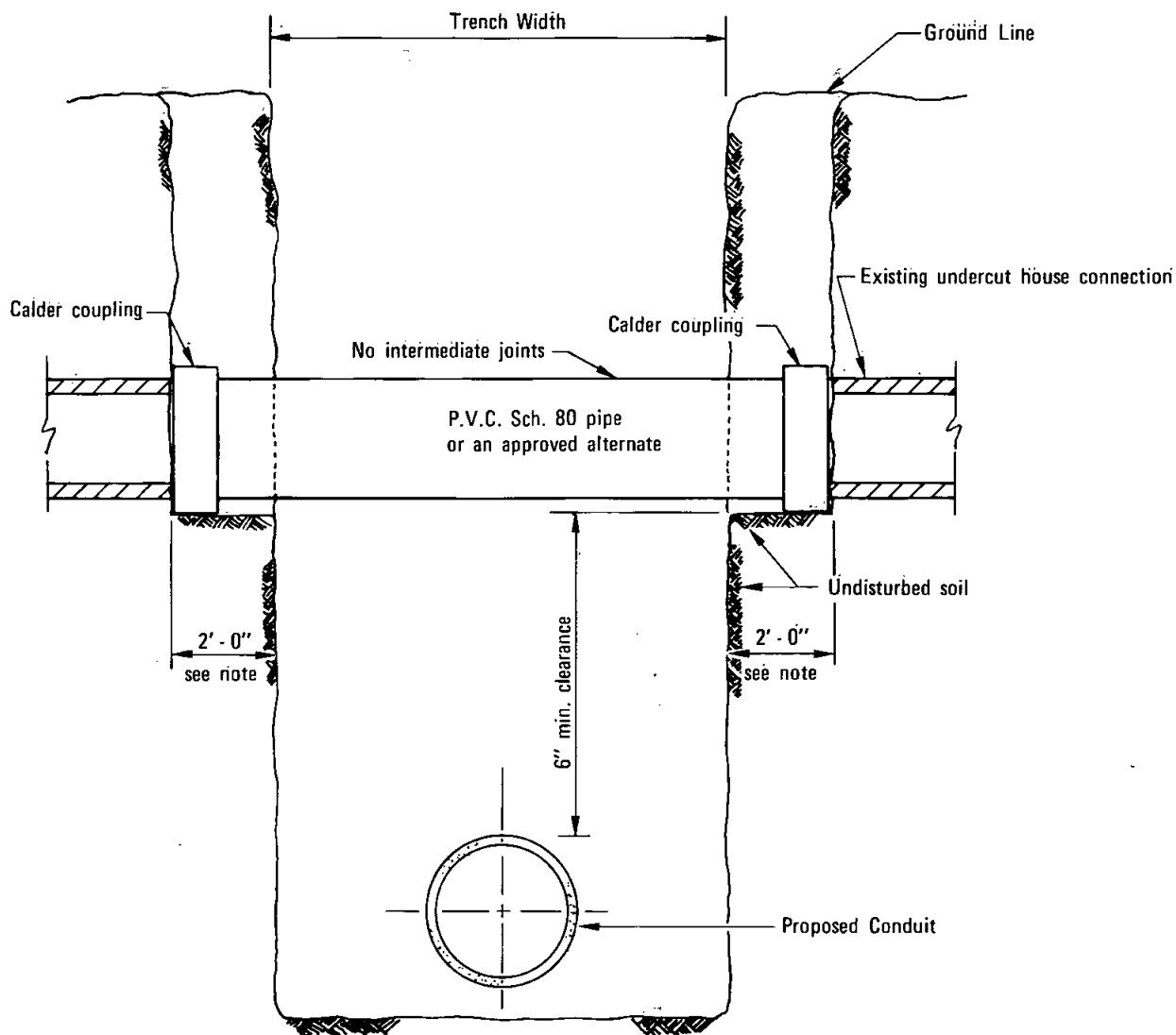
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER S-14**

SAN DIEGO REGIONAL STANDARD DRAWING

DEEP CUT HOUSE CONNECTION (SEWER LATERAL)

Revision	By	Approved	Date



TYPICAL SECTION

NOTE

For water line construction repair pipe shall extend to first joint beyond 2 ft. at both sides of trench or to a distance of 4 ft., whichever is less.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

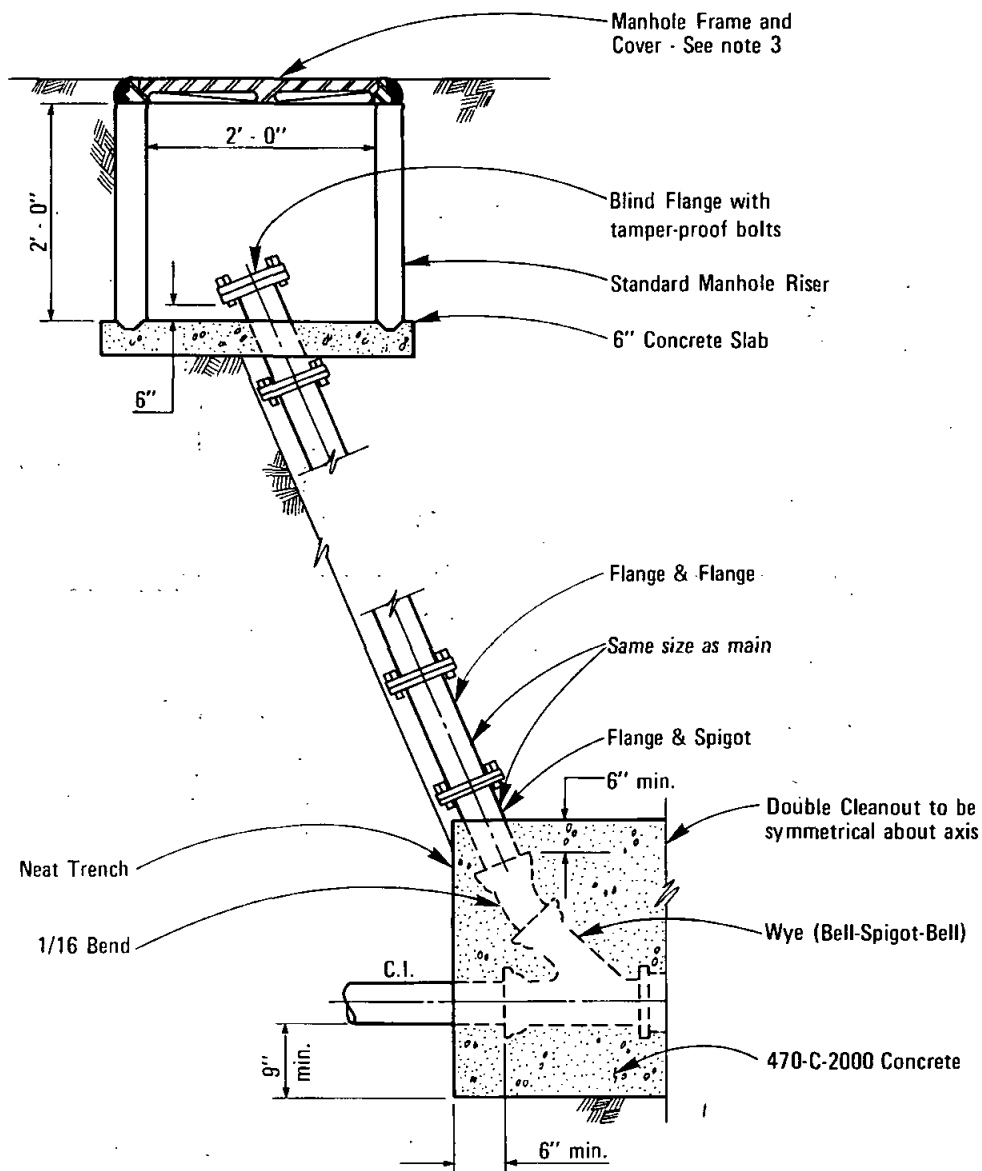
HOUSE CONNECTION SEWER REPAIR

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen G. Kershner *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER**

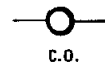
S-15



NOTES

1. Similar poly vinyl chloride components may be used in accordance with A.S.T.M. Standard Specification D-3033.
2. Concrete slab to be 564-C-3000
3. Use heavy duty manhole frame and cover, Std. Dwg. M-1, in areas subject to vehicular traffic; use light duty manhole frame and cover, Std. Dwg. M-2, in all other locations.

LEGEND ON PLANS



C.O.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

David A. Solomon July 1979
Coordinator R.C.E. 25291 Date

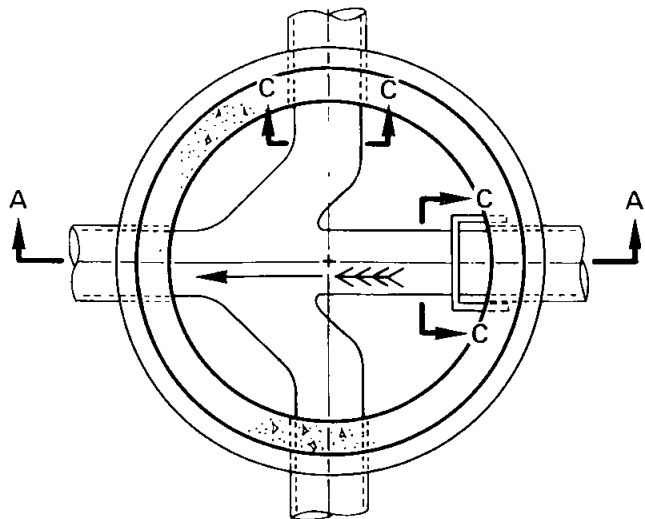
SAN DIEGO REGIONAL STANDARD DRAWING

CLEANOUT-SEWER FORCE MAIN

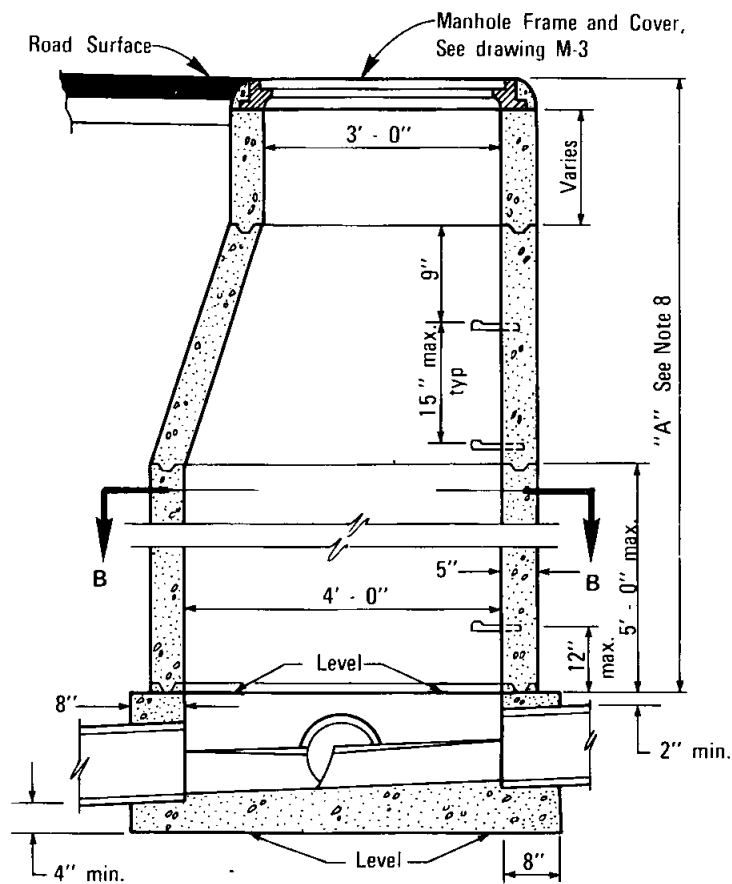
DRAWING
NUMBER

S-16

Revision	By	Approved	Date

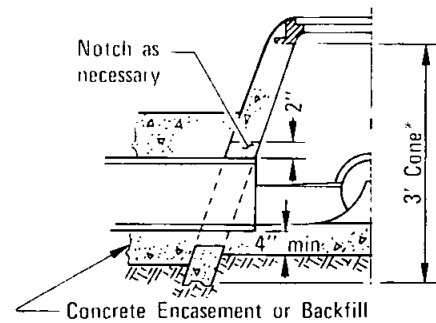
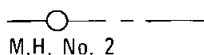


SECTION B-B



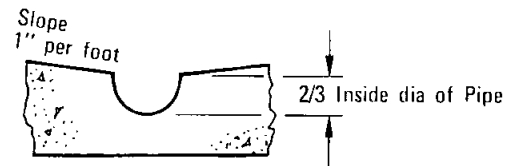
SECTION A-A

LEGEND ON PLANS

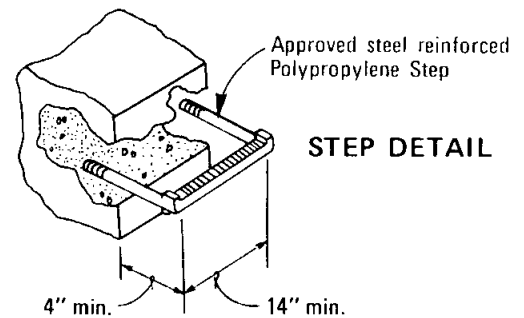


HALF SECTION SHALLOW MANHOLE

* Either Concentric or Eccentric Cone may be used.



SECTION C-C



STEP DETAIL

NOTES

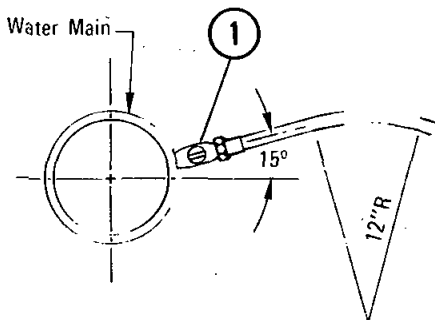
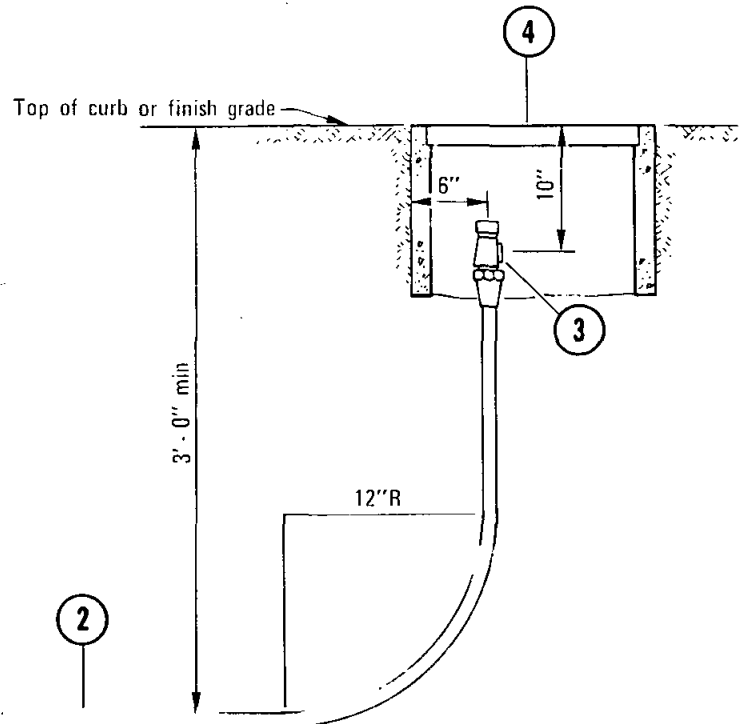
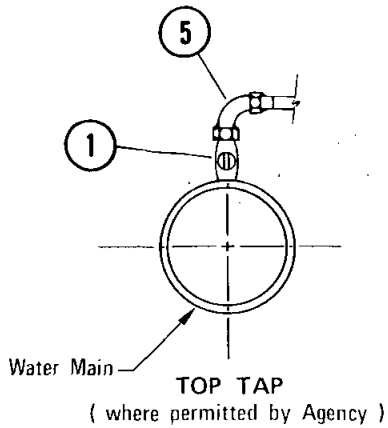
1. Manhole frame and all joints shall be set in Class "C" mortar.
2. All precast components shall be manufactured in accordance with ASTM C-478 except step spacing.
3. Vertical wall of cone shall be on the upstream side of the manhole.
4. Concrete base shall be 564-C-3000.
5. Approved water stop required for plastic pipe connections.
6. Flexible pipe joints shall be required within 12" of inside face of manhole.
7. Precast base permitted as approved by Agency.
8. Precast sections shall be used within dimension "A" as required, in order of preference listed:
 - A. Cone (notched for pipe if dimension "A" is less than 3').
 - B. 6" to 24" of 3' diameter grade rings.
 - C. 4' diameter shaft to maximum height of 60".
 - D. Additional 3' diameter risers.

Revision	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
			MANHOLE - 4' x 3' DIAMETER (FOR 21" MAX. DIA. PIPE)		<i>David S. Salomon</i> July 1979 Coordinator R.C.E. 25291 Date
					DRAWING NUMBER S-17

WATER SYSTEMS

NOTES

1. Service clamp and gasket required on 4" A.C. pipe.
2. Tap not permitted in milled sections of A.C. pipe.

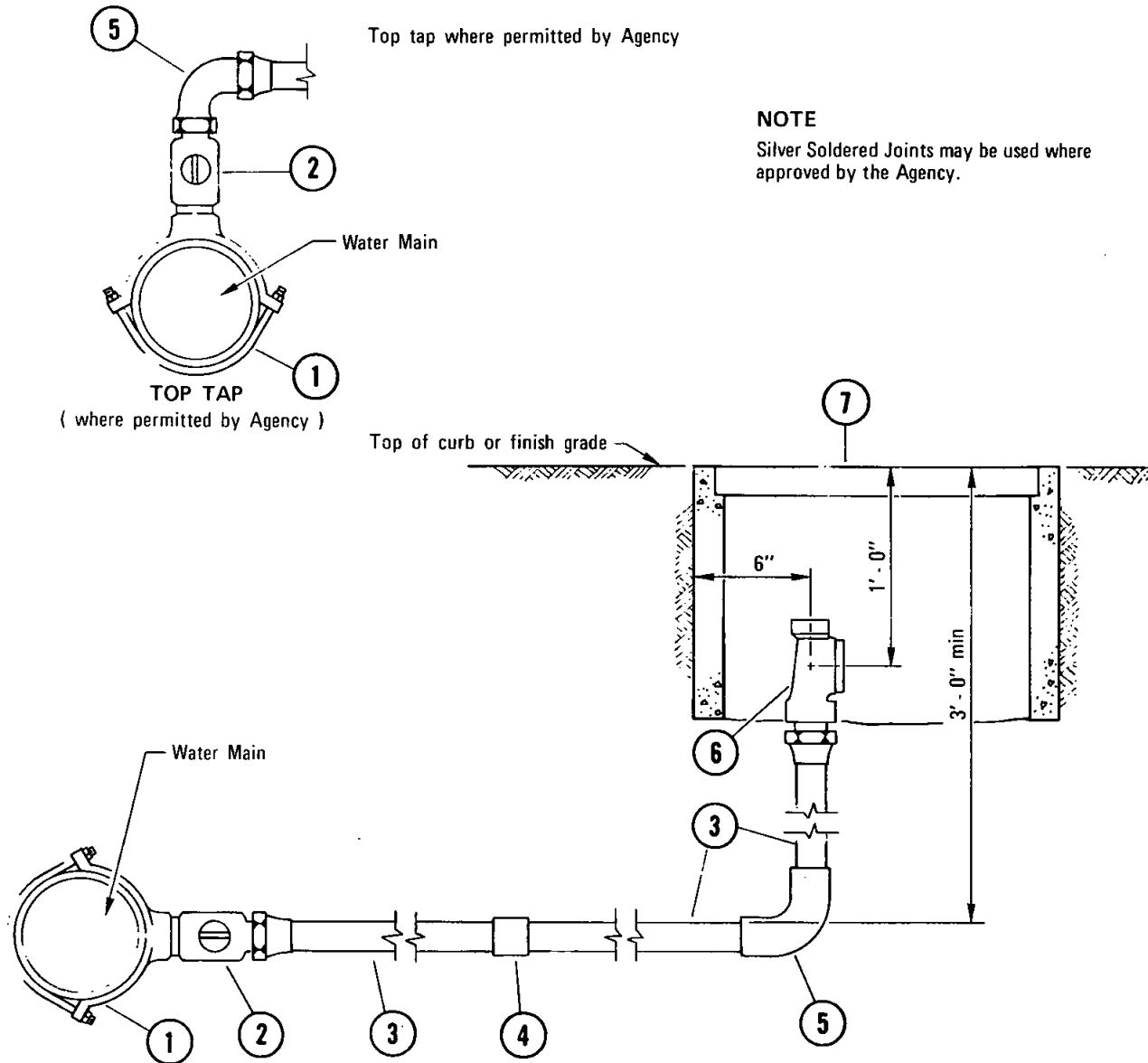


- ① Bronze Corporation Stop (installed with key on side and open tap) and Adaptor as required by Agency.
Note: On steel mains use clamp or weld on coupling as required by Agency.
Install insulating bushing as required by Agency.
- ② Copper Tubing or Plastic Pipe (no intermediate joints permitted without approval of the Agency).
- ③ Bronze Angle Service Stop with Locking Device and Meter Coupling attached.
- ④ Meter Box (see Standard Drawing W-15 for location).
- ⑤ 90° Ell

LEGEND ON PLANS

1" (W)

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Notes	SC	D.S.	7-79			
				1" WATER SERVICE		<i>Allan G. Kerschman</i> Dec. 1975 Coordinator R.C.E. 19807 Date
						DRAWING NUMBER
						W-1



- ① Bronze Service Clamp (double strap). On steel mains use clamp or weld on coupling as required by Agency. Install insulating bushing as required by Agency.
- ② Bronze Corporation Stop (installed with key on side and open tap).
- ③ Copper Tubing or Plastic Pipe except where otherwise specified by the Agency.
- ④ Coupling as required by Agency when service is 20' or longer, except on Polyethylene Pipe.
- ⑤ 90° Ell
- ⑥ Bronze Angle Service Stop with Locking Device and adaptable to 1 1/2" and 2" Meter Flange.
- ⑦ Meter Box (see Standard Drawing W-15 for location).

LEGEND ON PLANS

2" (W)

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

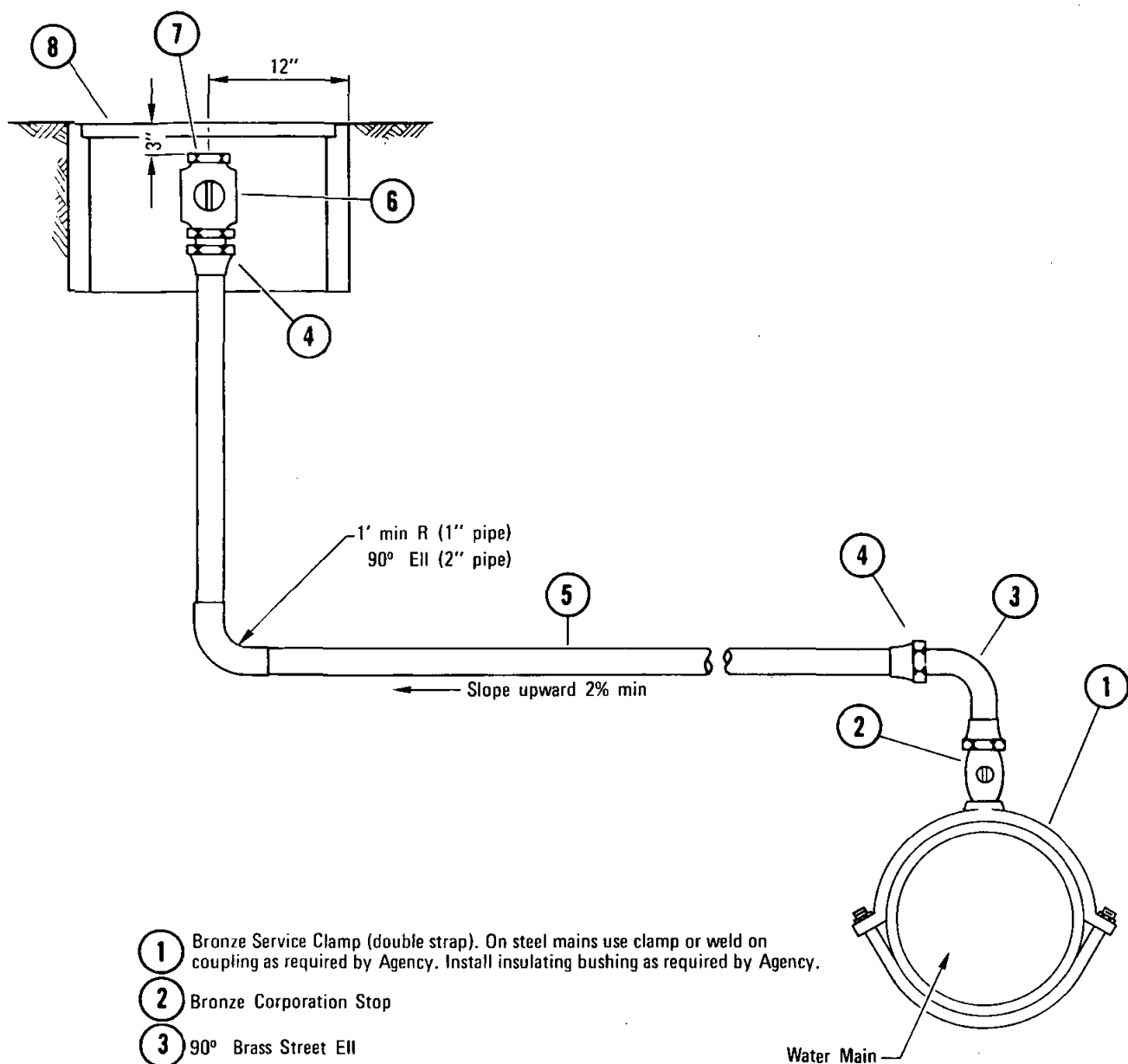
Allen P. Kuehn Dec. 1975
Coordinator R.C.L. 19807 Date

DRAWING
NUMBER **W-2**

SAN DIEGO REGIONAL STANDARD DRAWING

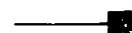
1 1/2" AND 2" WATER SERVICES

Revision	By	Approved	Date
Notes	<i>SC</i>	<i>D.S.</i>	7-79

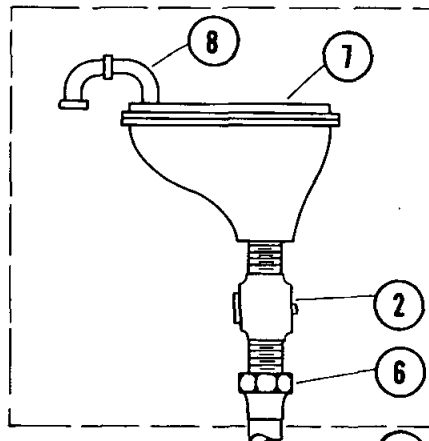


- 1 Bronze Service Clamp (double strap). On steel mains use clamp or weld on coupling as required by Agency. Install insulating bushing as required by Agency.
- 2 Bronze Corporation Stop
- 3 90° Brass Street Ell
- 4 Pipe to Tubing Adaptor
- 5 Copper Tubing
- 6 Ball Valve
- 7 Brass Plug
- 8 Meter Box (see Standard Drawing W-15 for location).

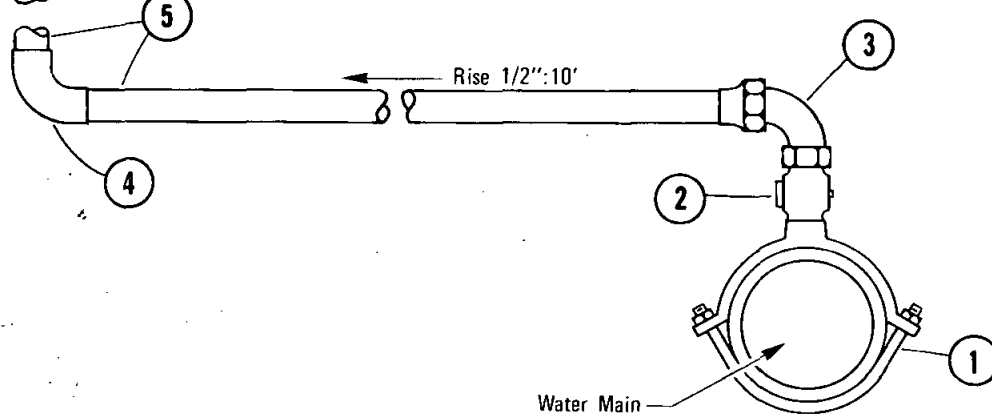
LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
Notes	<i>D.S.</i>	<i>7-79</i>				<i>Allen G. Kerschman</i>	<i>Dec. 1975</i>
				1" AND 2" MANUAL AIR RELEASES		Coordinator R.C.E. 19807	Date
						DRAWING NUMBER	W-3

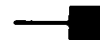


See drawing W-14, for type and location of enclosures



- ① Double Strap Bronze Service Clamp. On steel mains use clamp or weld on coupling as required by Agency. Install insulating bushing as required by Agency.
- ② Corporation Stop
- ③ Pipe x Tubing 90° Ell
- ④ 90° Sweat Ell
- ⑤ Copper Tubing
- ⑥ Female Adaptor
- ⑦ Air and Vacuum Valve
- ⑧ 2-90° Ells (not required in above metal ground enclosures).

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

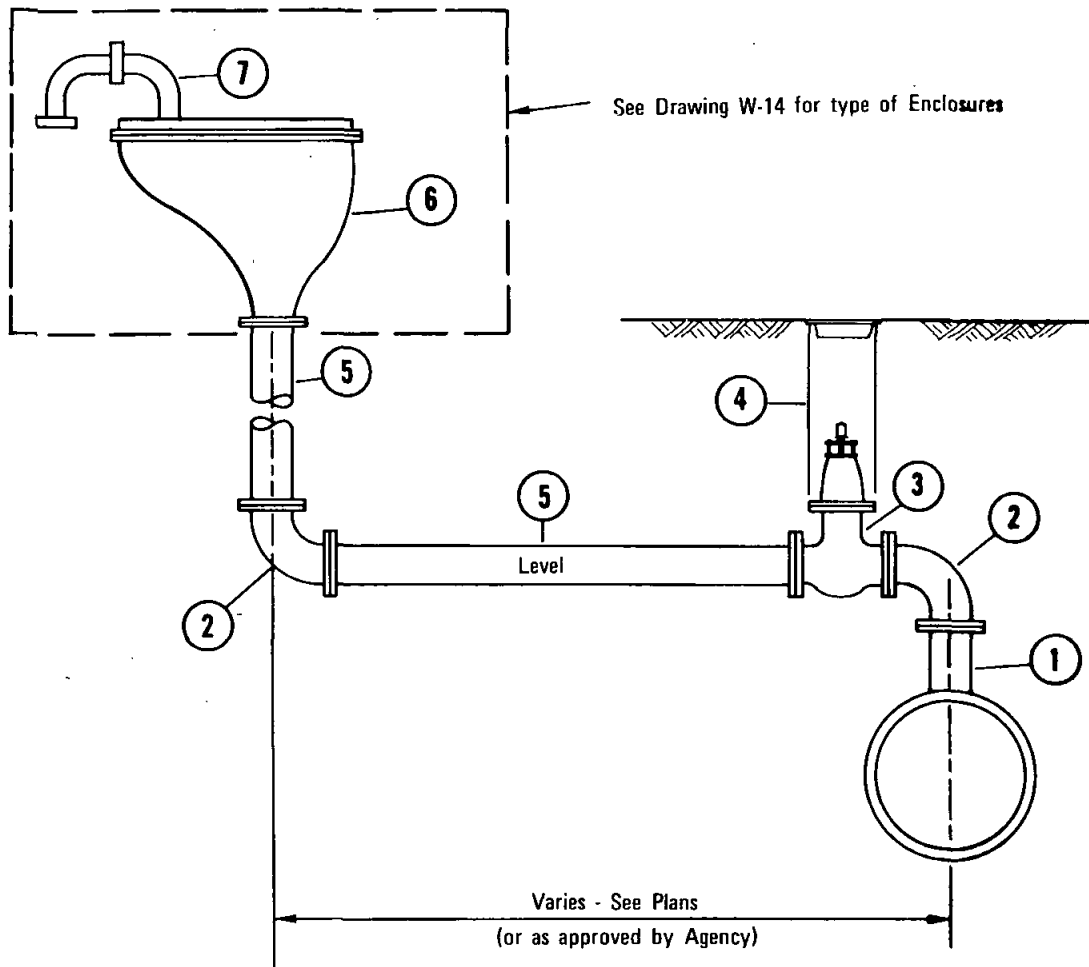
Alfred A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

1" AND 2" AIR AND VACUUM VALVES

DRAWING
NUMBER **W-4**

Revision	By	Approved	Date
Notes	<i>JS</i>	<i>O.S.</i>	7-79

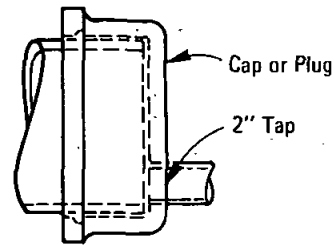
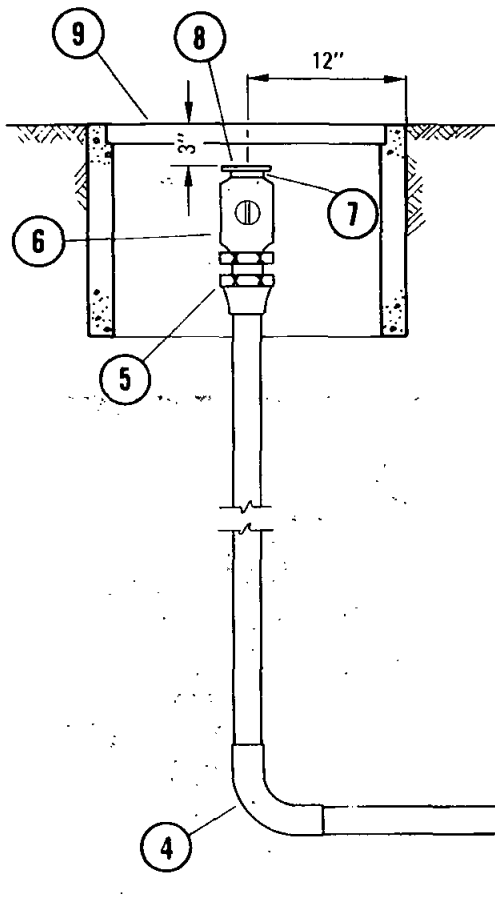


- ① Flanged Outlet, Cement Lined and Coated Steel
- ② Flanged, 90° Ell, Cement Lined and Coated Steel
- ③ Valve
- ④ Valve Well and Cap (see Standard Drawing W-12)
- ⑤ Steel Pipe, Cement Lined and Coated
- ⑥ Air and Vacuum Valve
- ⑦ 2-90° Ells (not required with above ground metal enclosures)

LEGEND ON PLANS



Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				4" AND 6" AIR AND VACUUM VALVES		<i>Allen A. Kuehn</i>	<i>Dec. 1975</i>
						Coordinator	R.C.E. 19807
						Date	
						DRAWING NUMBER	W-5



END OF MAIN DETAIL

- ① Bronze Service Clamp (double strap). On steel mains use clamp or weld on coupling as required by Agency. Install insulating bushing as required by Agency.
- ② Bronze Corporation Stop (installed with key on side and open tap) and adaptor as required by Agency.
- ③ Copper Tubing
- ④ 90° Ell
- ⑤ Pipe to Tubing Adaptor
- ⑥ Ball Valve
- ⑦ Brass 2" Iron Pipe Thread x 2 1/2" Hose Pipe Thread Adaptor.
- ⑧ 2 1/2" Hose Cap with chain, Brass.
- ⑨ Meter Box (see Standard Drawing W-15 for location).

LEGEND ON PLANS

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Alfred A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

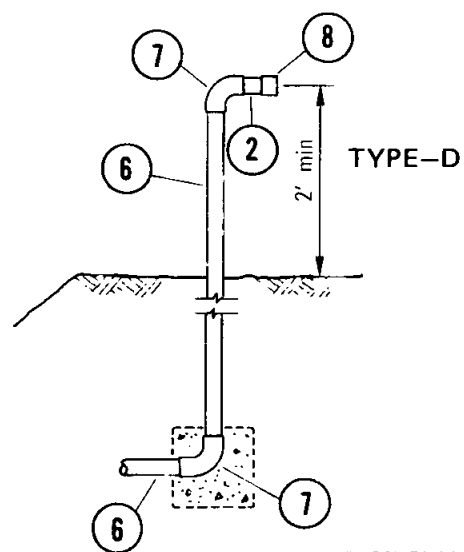
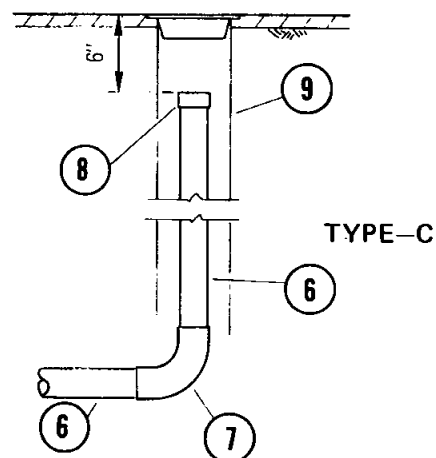
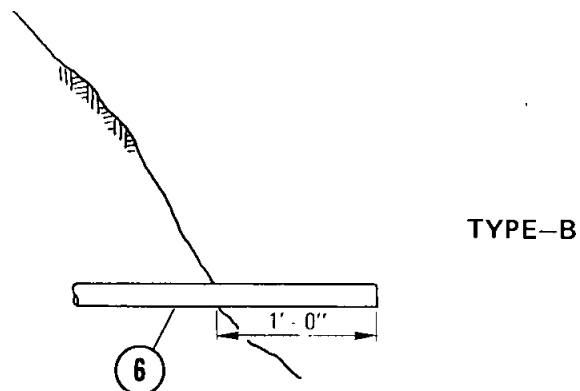
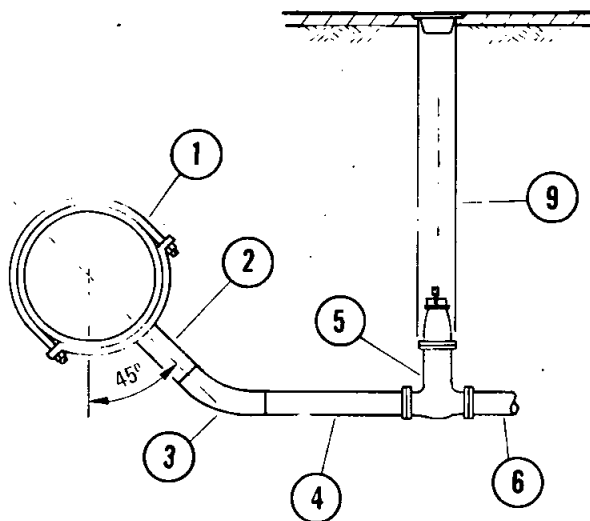
DRAWING
NUMBER

W-6

SAN DIEGO REGIONAL STANDARD DRAWING

2" BLOW-OFF ASSEMBLY - TYPE A

Revision	By	Approved	Date
Detail	<i>JS</i>	<i>D.S.</i>	7-79



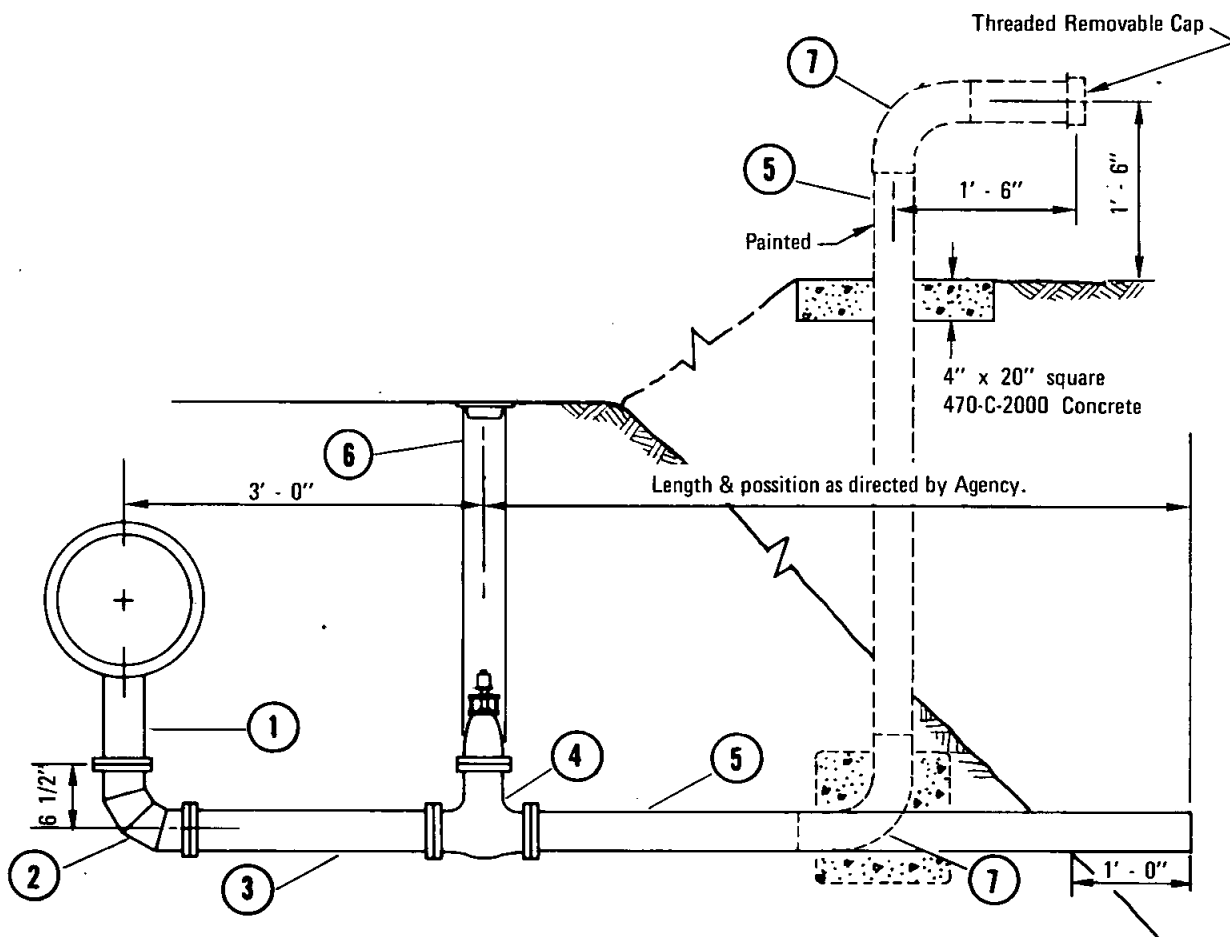
- 1 Bronze Service Clamp (double strap) or Pretapped Coupling. On steel mains use clamp or weld on coupling as required by Agency. Install insulating bushing as required by Agency.
- 2 2" Nipple (2"x 3")
- 3 45° Ell
- 4 2" Nipple (2"x 6")
- 5 2" Valve
- 6 2" Pipe
- 7 90° Ell
- 8 2" Threaded Cap
- 9 Valve Well Installation, See Standard Drawing W-12

NOTES

1. Type of installation and materials to be specified by Agency.
2. See Standard Drawing W-6 for end of main detail.

LEGEND ON PLANS

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
Notes	SC	P.S.	7-79		
				2" BLOW-OFF ASSEMBLIES TYPES B, C AND D	<i>Allard A. Kerschbaum</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER W-7



- ① Flanged Tee or Welded Saddle.
- ② Short Radius 90° Flanged Bend, Cement Lined and Coated.
- ③ Steel Pipe, Cement Lined and Coated.
- ④ Flanged Valve.
- ⑤ Steel Pipe (or P. V. C. Schedule 80 Pipe Where Permitted by Agency).
- ⑥ Valve Well (See Standard Drawing W-12).
- ⑦ 90° Bend (Same Material as Item 5).

LEGEND ON PLANS

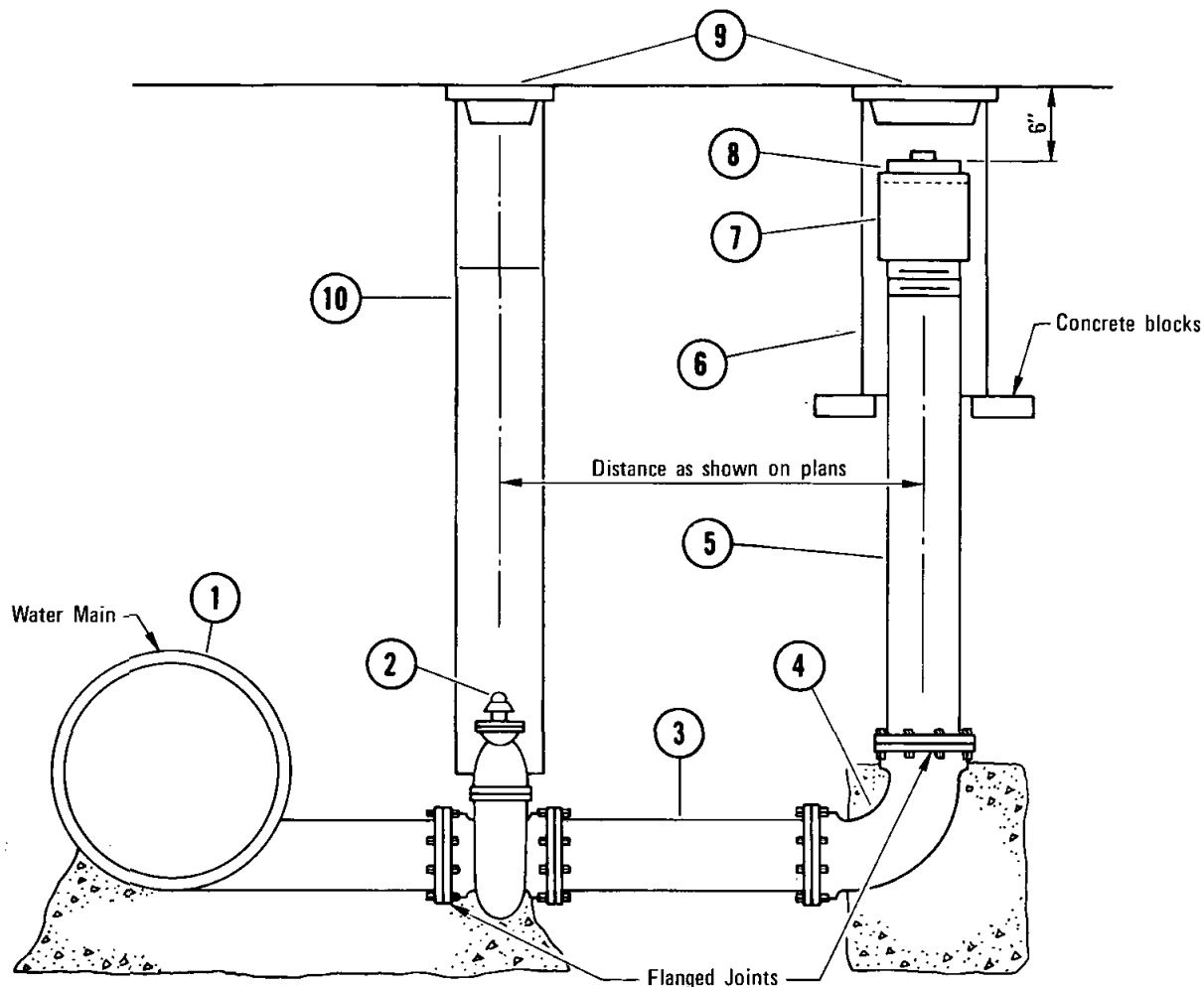
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allan A. Kuehn Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

4" AND 6" BLOW-OFF ASSEMBLIES TYPE A

DRAWING
NUMBER **W-8**

Revision	By	Approved	Date



- ① Main Size x Flanged Outlet, cement lined and coated.
- ② Flanged Gate Valve (F x RT for A.C. Pipe).
- ③ Cast Iron Pipe or A.C. Pipe (6 1/2' min for A.C. Pipe).
- ④ F x F 90° Bend (F x RT for A.C. Pipe).
- ⑤ Galvanized Iron Pipe, threaded and flanged.
- ⑥ 10" Class 200 A.C. Pipe Gate Well.
- ⑦ Galvanized Iron Coupling, threaded.
- ⑧ Galvanized Iron Plug.
- ⑨ Gate Well Cap with 4" skirt.
- ⑩ Valve Well (see Standard Drawing W-12).

LEGEND ON PLANS



Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

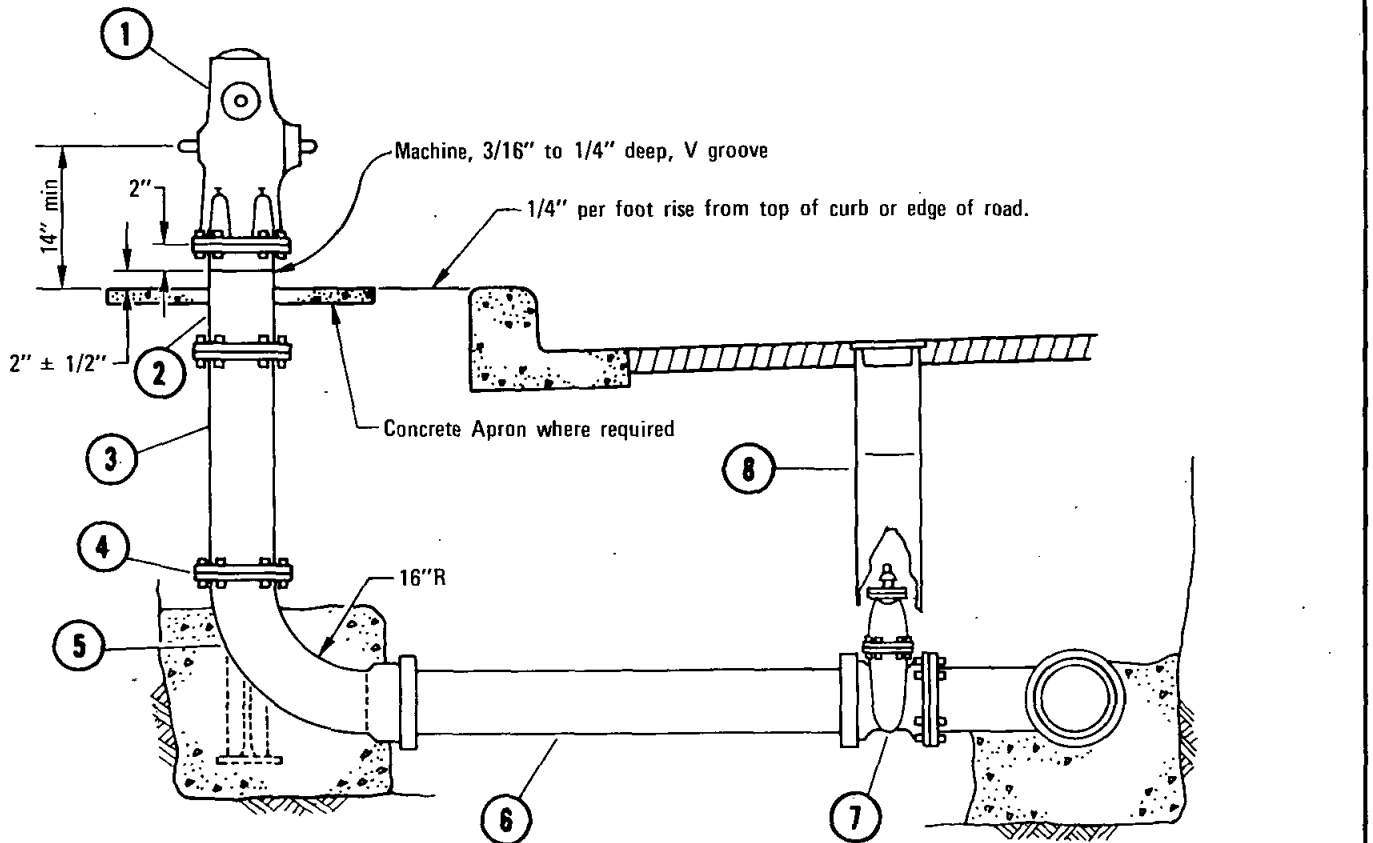
**4" AND 6" BLOW-OFF ASSEMBLIES
TYPE B**

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kischner *Dec. 1975*
Coordinator R.C.E. 19807 Date

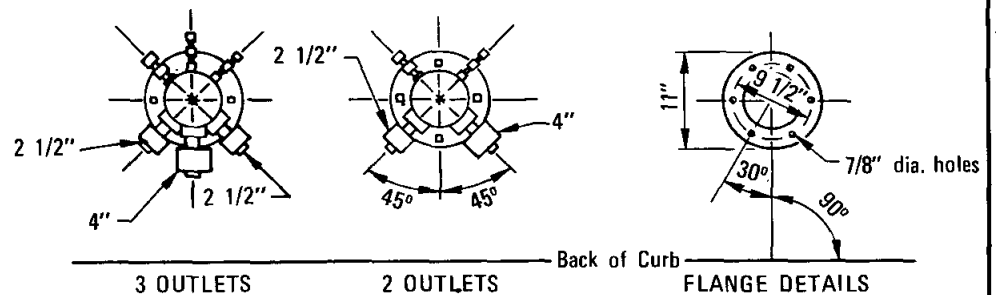
DRAWING
NUMBER

W-9



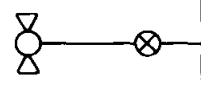
NOTE

Items 2, 3 & 6 may be cement lined and coated flanged steel pipe where permitted by Agency.



- 1 Fire Hydrant
- 2 12" long Extension Spool
- 3 Extension Spool
- 4 3/4"x 3" Hex. Head Machine Bolts and Nuts, Typical.
- 5 Hydrant Ell
- 6 Asbestos Cement Pipe
- 7 Valve
- 8 Valve Well Installation (see Standard Drawing W-12)

LEGEND ON PLANS



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

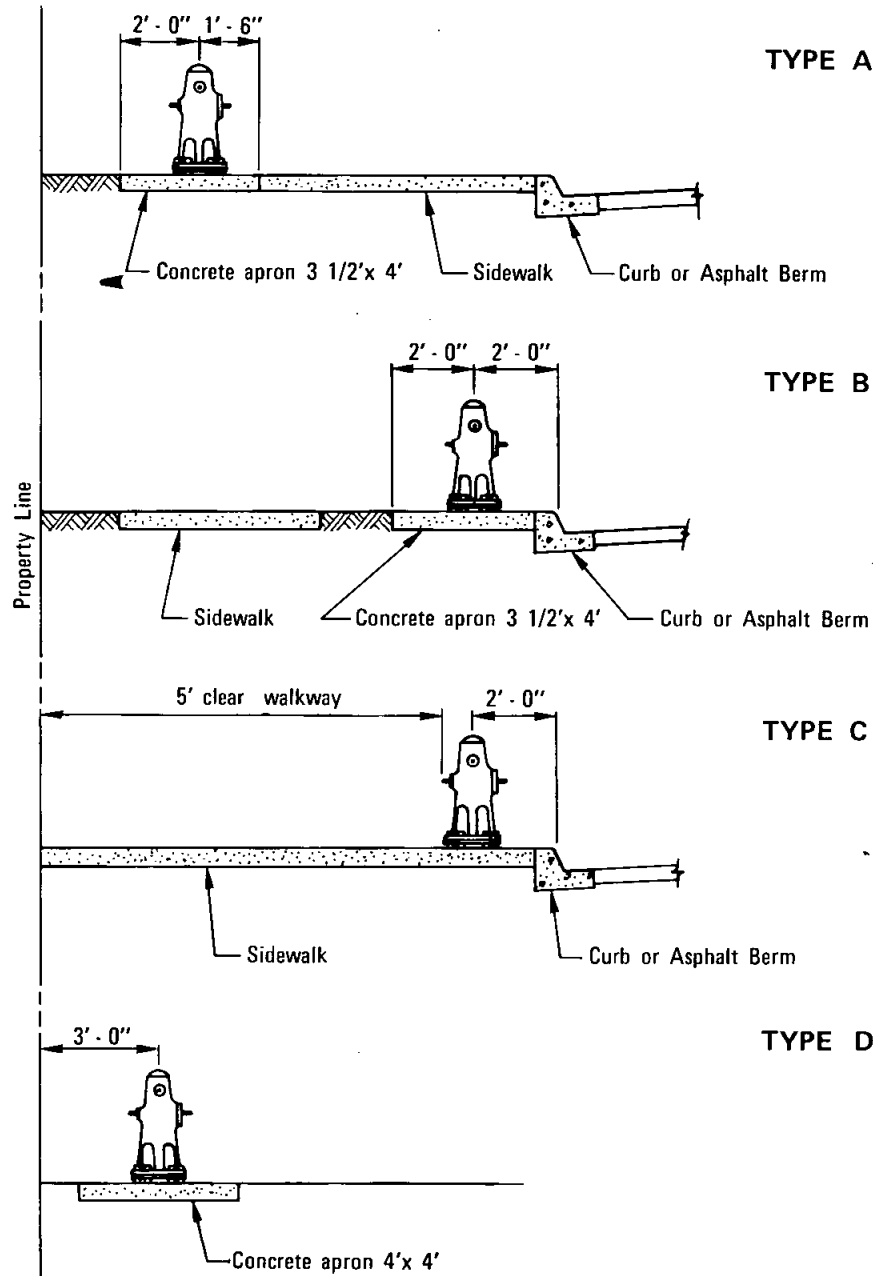
Allan G. Kersch Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

6" FIRE HYDRANT

DRAWING
NUMBER **W-10**

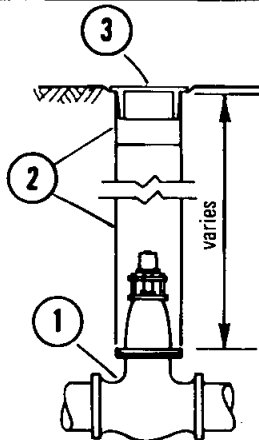
Revision	By	Approved	Date



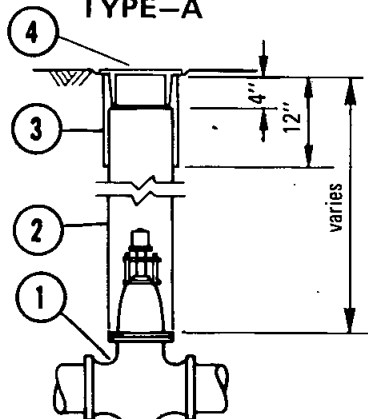
NOTES:

1. Apron, where required by Agency, shall be 4" thick (470-C-2000) concrete.
2. When distance from hydrant to the top or toe of slope is less than 2' - 0", special hydrant installation will be required by Agency.
3. Where hydrant is not protected by a vertical face curb protective posts are required. See Standard Drawing W-16 for details.
4. Hydrant shall be located 5' from curb return, 3' min from driveway, on property line extension, or as shown on plans.

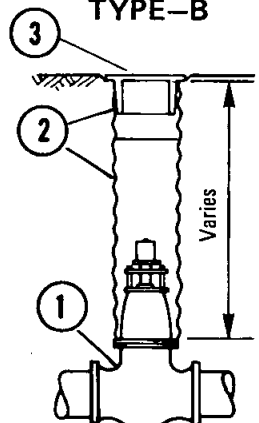
Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				FIRE HYDRANT LOCATIONS		<i>Allan A. Kuehn</i> Dec. 1975
						Coordinator R.C.E. 19807 Date
						DRAWING NUMBER W-11



TYPE-A



TYPE-B



TYPE-C

- ① Valve
- ② 8" Asbestos Cement Pipe, Class 150
- ③ 8" Valve Well Cap with 4" Skirt

NOTES

1. Provide clamp or felt to hold pipe sections (item 2) together during backfill.
2. Pipe shall be saw or machine cut on each end, no beveled sections will be permitted.
3. The final adjustment to finish grade may be made with an asbestos cement ring of 1" minimum height.

- ① Valve
- ② 8" O.D. Steel Pipe, or 10 Ga. Asphalt Coated and Lined.
- ③ 8 5/8" O.D. Steel Pipe or 10 Ga. Asphalt Coated and Lined.
- ④ 8" Valve Well Cap with 4" Skirt

- ① Valve
- ② 8" Corrugated Steel Pipe, 16 Gage
- ③ 8" Valve Well Cap with 4" Skirt

NOTE

Pipe sections shall be tack welded together.

GENERAL NOTES

1. Clearance around cover shall permit lifting by hand without damage to pipe. Maximum clearance shall be 3/16".
2. See Standard Drawing W-13 for valve stem extension, when required by Agency.

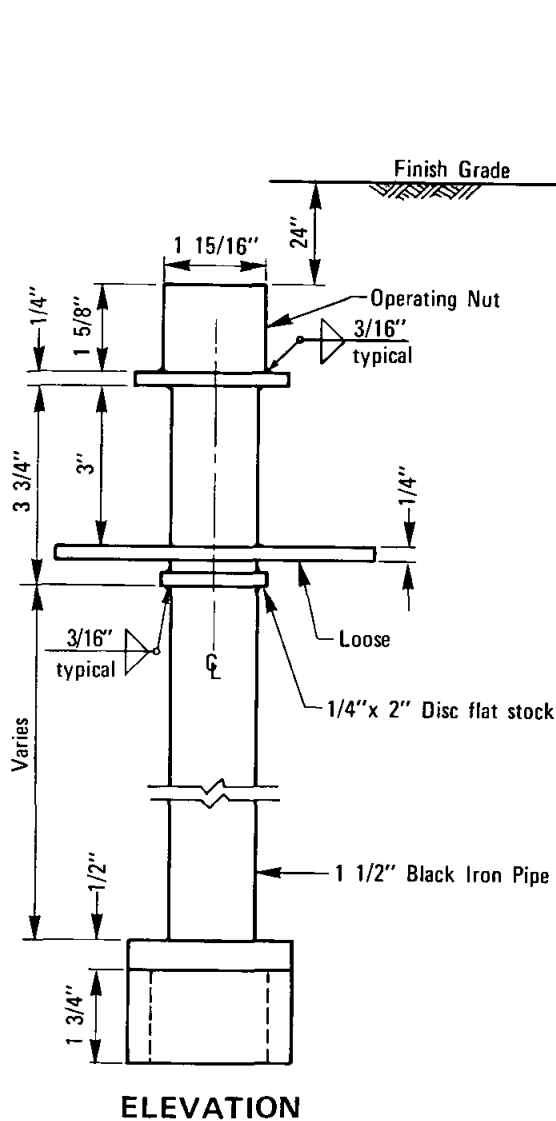
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE
Allard A. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

SAN DIEGO REGIONAL STANDARD DRAWING

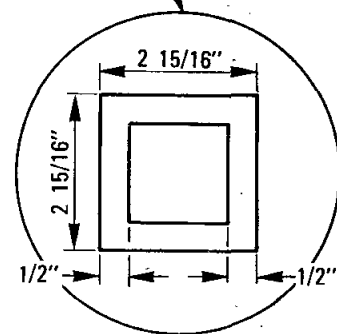
VALVE WELL INSTALLATION

DRAWING
NUMBER **W-12**

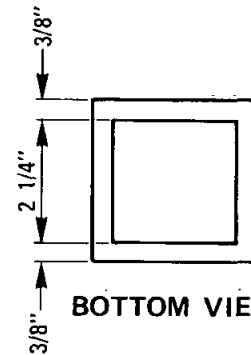
Revision	By	Approved	Date



Diameter varies. Make 1/4" less than I.D. of can.



TOP VIEW



BOTTOM VIEW

NOTES

1. Extension to be used when top of valve nut is 5' or more below finish grade.
2. Paint all finished surfaces with asphalt varnish.

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

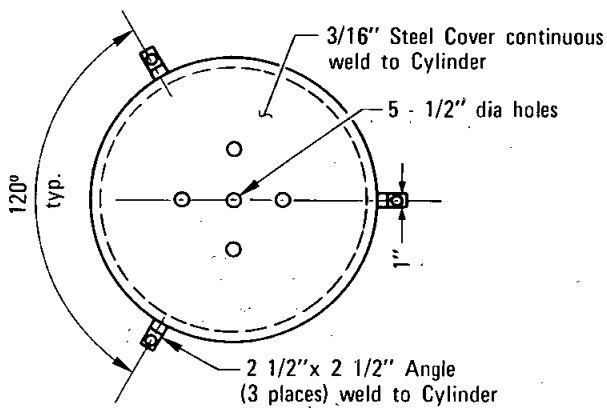
VALVE STEM EXTENSION

RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE

Allan A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

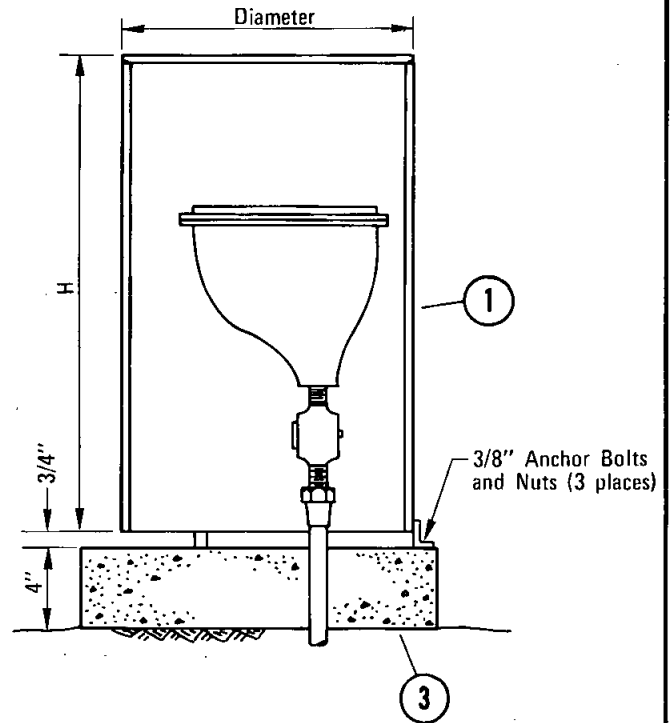
DRAWING
NUMBER

W-13

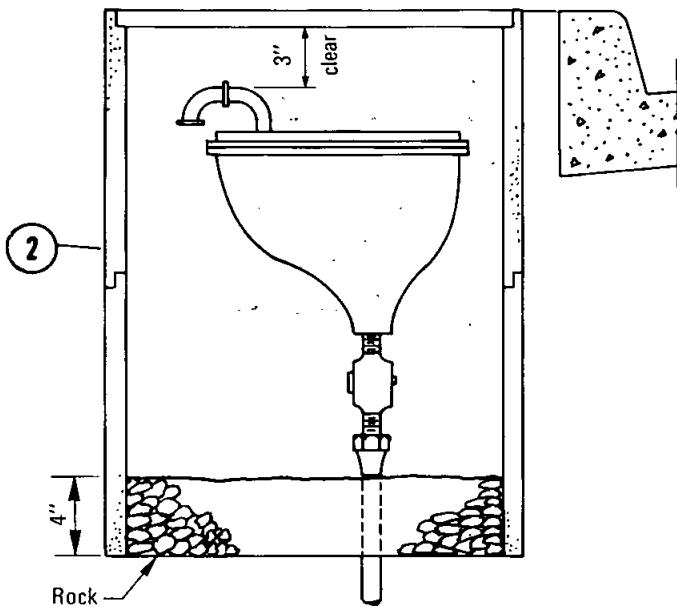


PLAN

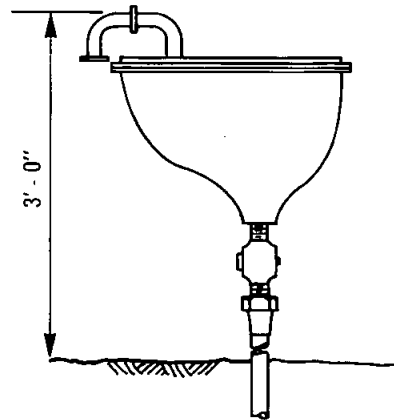
Valve Size	Dia	H
1" & 2"	14"	24"
4"	14"	30"
6"	16"	36"



TYPE A



TYPE B



TYPE C

- ① Steel enclosure, paint as specified by Agency.
- ② Meter box, see Standard Drawing W-15 for location.
- ③ 2' x 2' pad, 470 - C - 2000 Concrete

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

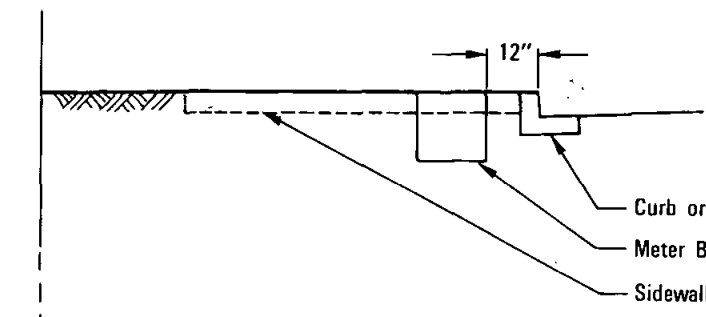
Allan G. Kerschbaum Dec. 1975
Coordinator R.C.E. 19807 Date

DRAWING
NUMBER **W-14**

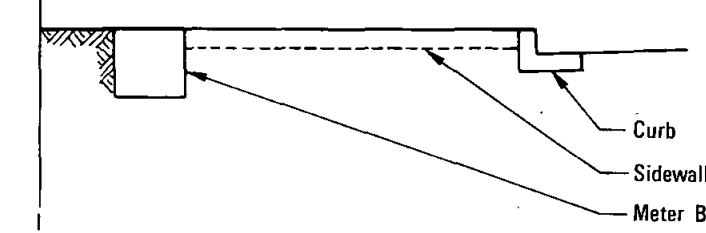
SAN DIEGO REGIONAL STANDARD DRAWING

AIR AND VACUUM VALVE ENCLOSURES

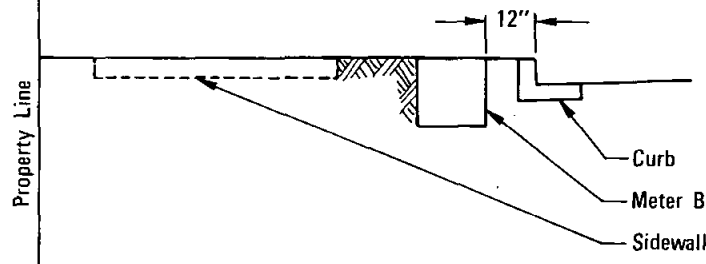
Revision	By	Approved	Date



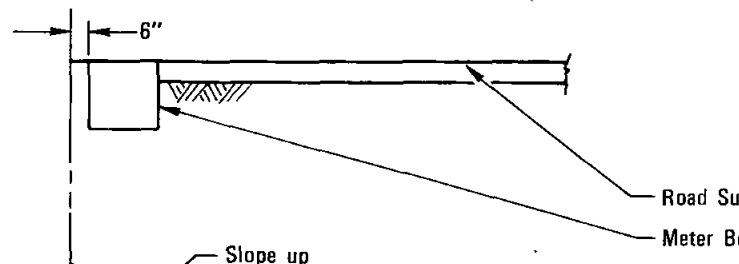
TYPE *A1
WITH OR WITHOUT COMMERCIAL
OR RESIDENTIAL SIDEWALK



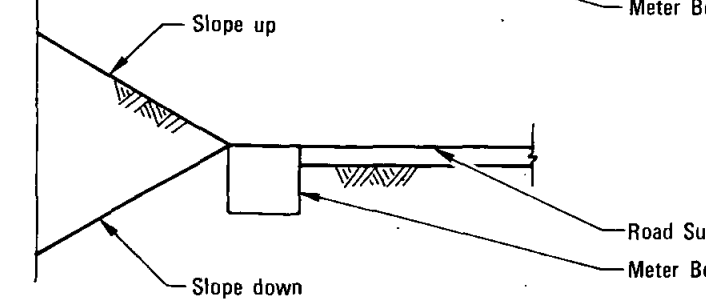
TYPE *A2
CONTIGUOUS SIDEWALK



TYPE B
NON-CONTIGUOUS SIDEWALK



TYPE C
NO CURB



TYPE D
NO CURB

* Agency to determine alternate

Revision	By	Approved	Date

SAN DIEGO REGIONAL STANDARD DRAWING

METER BOX LOCATIONS

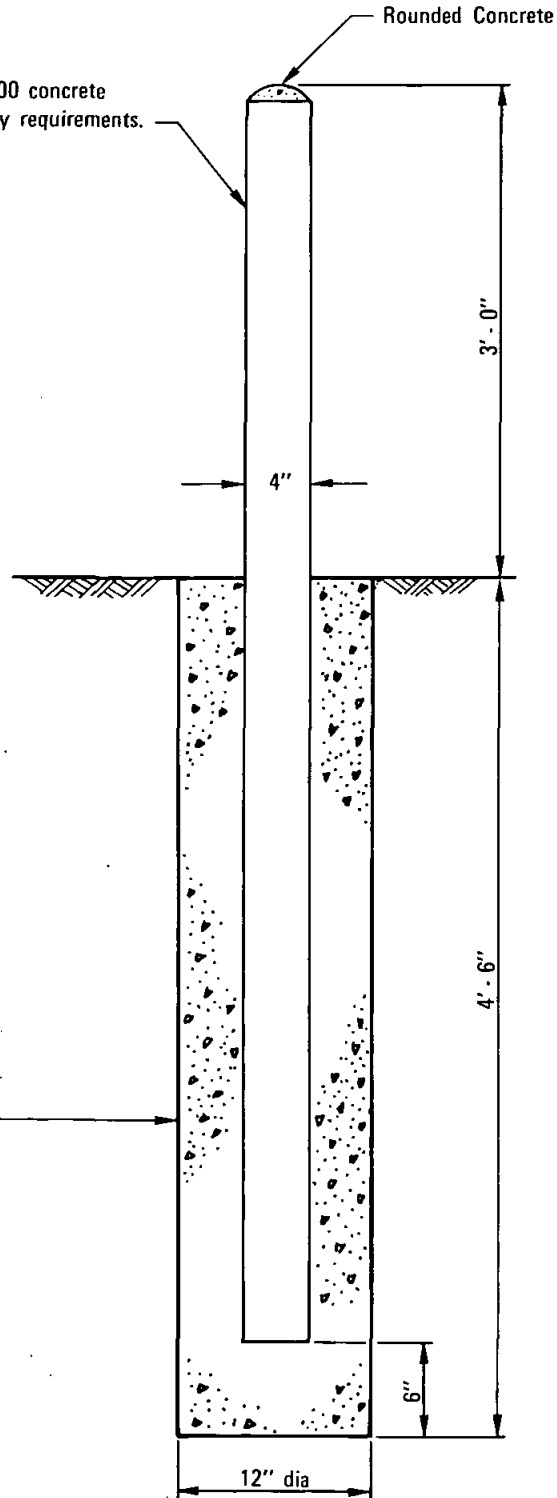
RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allen A. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

**DRAWING
NUMBER W-15**

4" steel pipe filled with 470 - C - 2000 concrete
and painted in accordance with Agency requirements.

470 - C - 2000 concrete



RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allard A. Kuehnel Dec. 1975
Coordinator R.C.E. 19807 Date

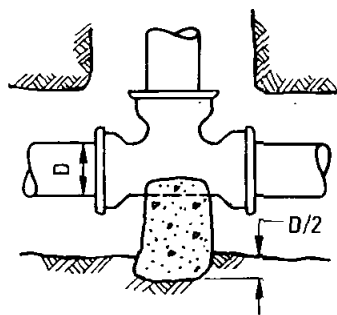
SAN DIEGO REGIONAL STANDARD DRAWING

DRAWING
NUMBER

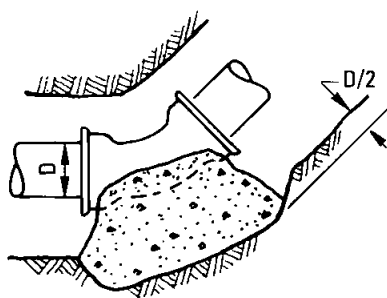
W-16

PROTECTION POST

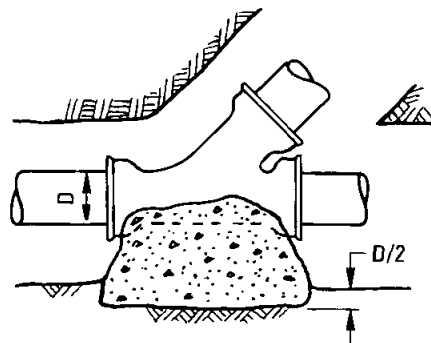
Revision	By	Approved	Date



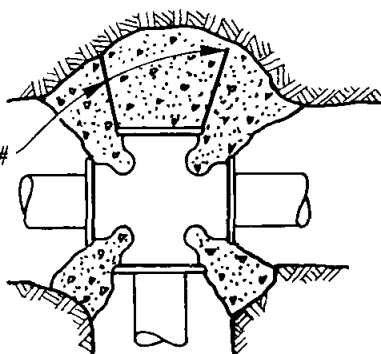
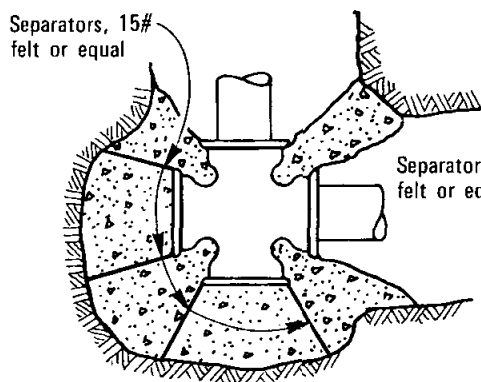
TEE



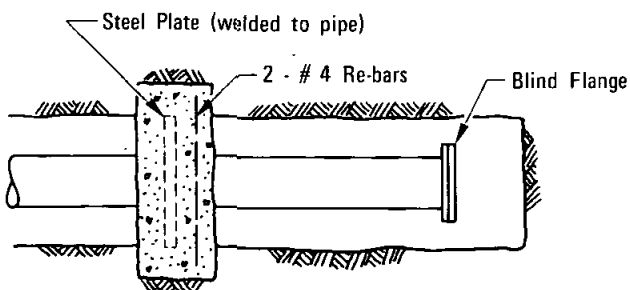
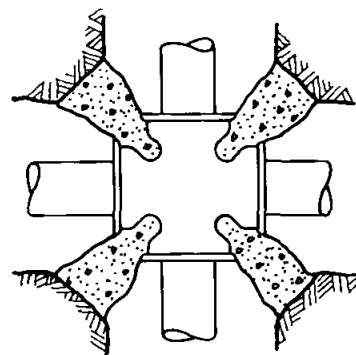
HORIZONTAL OR
VERTICAL BEND



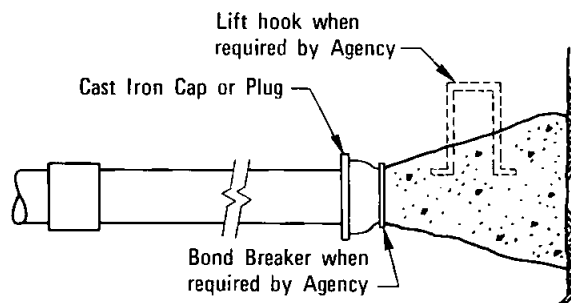
WYE



CROSS BLOCKING



STEEL PIPE
PLAN



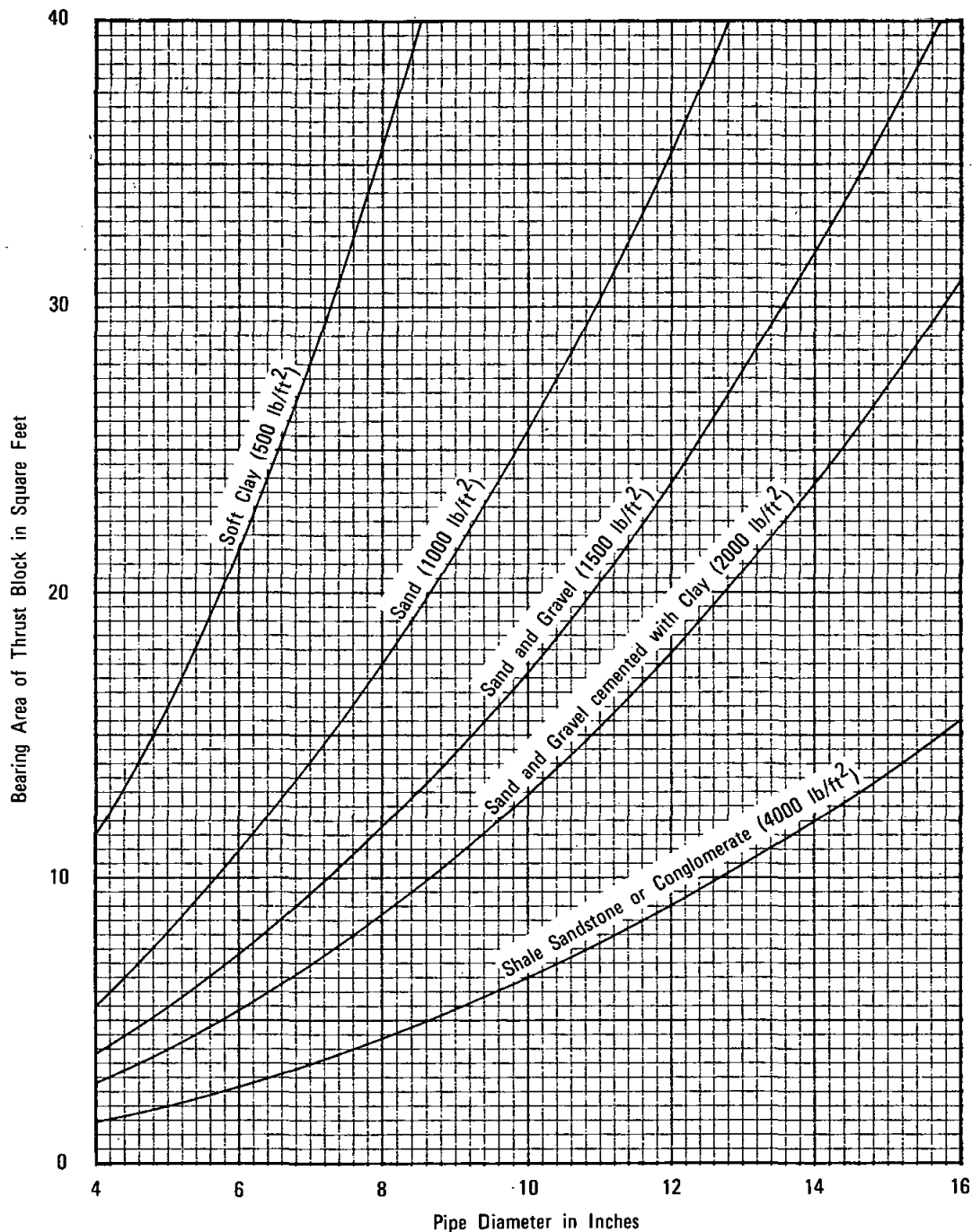
A.C. PIPE
ELEVATION

DEAD END BLOCKING

NOTES

1. Concrete shall be 470 - C - 2000.
2. See Standard Drawing W-18 for bearing areas.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
				CONCRETE THRUST BLOCKS		<i>Allan A. Kuehn</i> Dec. 1975	
						Coordinator R.C.E. 19807 Date	
						DRAWING NUMBER	
						W-17	



NOTES

1. Based on 225 psi test pressure and bearing values of dry soils.
2. Values from curves are for tees and deadends, i.e.; straight line thrust.
For 90° bend: 1.4 value from curve.
For 45° bend: 0.8 value from curve.
For 22 1/2° bend: 0.4 value from curve.
3. For conditions not covered by curves, special thrust blocks must be computed and approved.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan O. Kuehn *Dec. 1975*
Coordinator R.C.E. 19807 Date

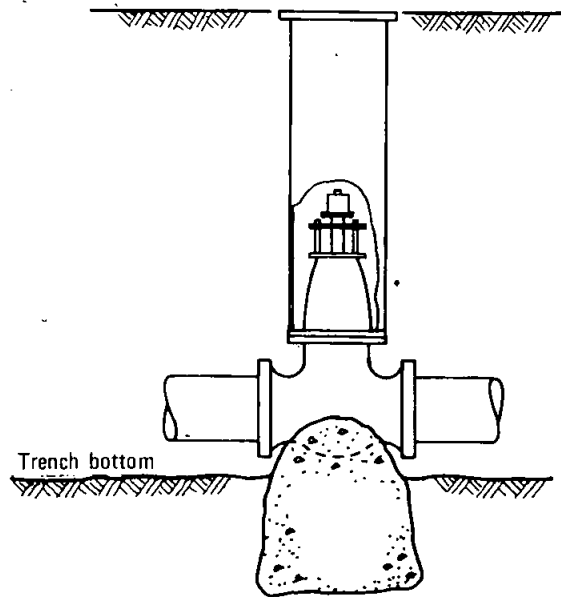
SAN DIEGO REGIONAL STANDARD DRAWING

THRUST BLOCK BEARING AREAS

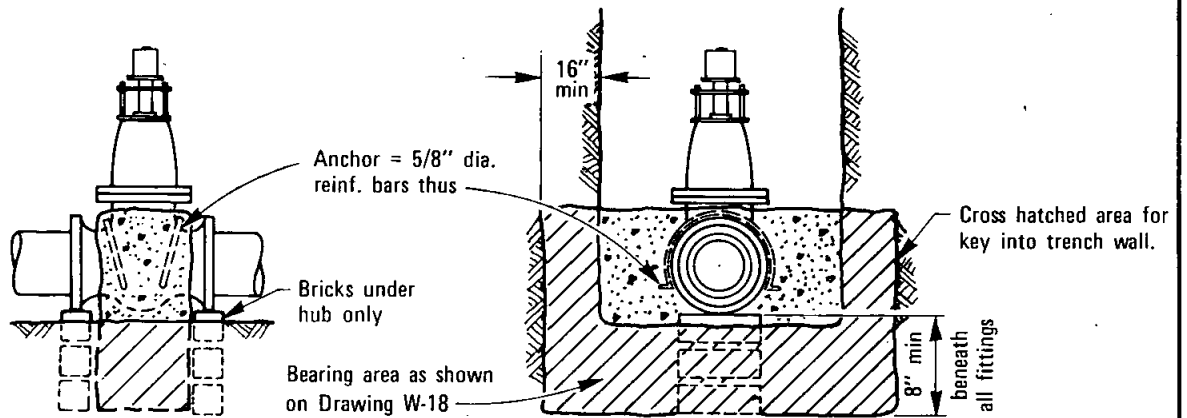
DRAWING
NUMBER

W-18

Revision	By	Approved	Date



TYPE-A SUPPORT BLOCK

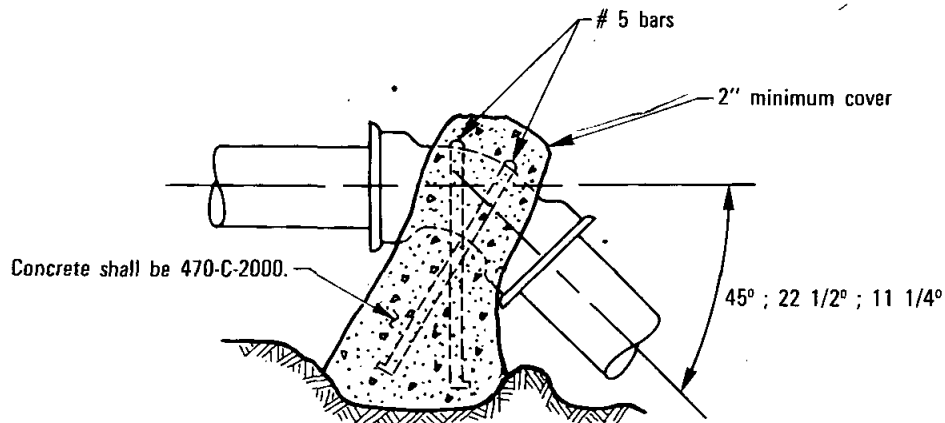


TYPE-B THRUST BLOCK

NOTE

Concrete shall be 470-C-2000.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
				CONCRETE VALVE BLOCKING	<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date
					DRAWING NUMBER W-19



Pipe Nominal Dia	Cubic Ft. Of Concrete Required per 100 P.S.I. Pressure *		
	45°	22 1/2°	11 1/4°
4	7	4	2
6	15	8	4
8	27	14	7
10	**	21	11
12	**	**	16

* Increase volumes shown in proportion to pressures existing when pressure testing pipeline.

** Special design required.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

Allan A. Kerschman *Dec. 1975*
Coordinator R.C.E. 19807 Date

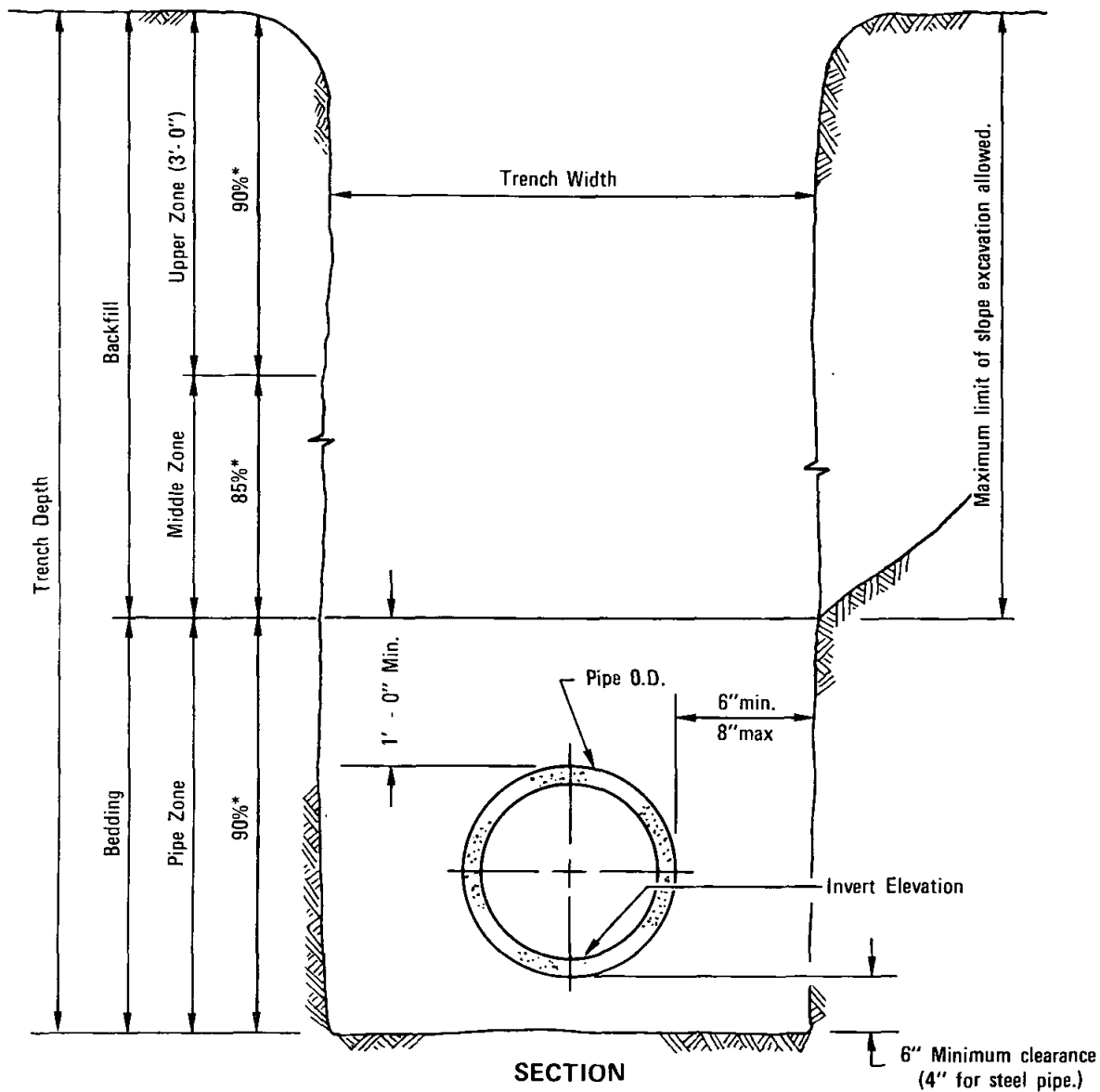
DRAWING
NUMBER

W-20

SAN DIEGO REGIONAL STANDARD DRAWING

ANCHOR BLOCK (VERTICAL BEND ONLY)

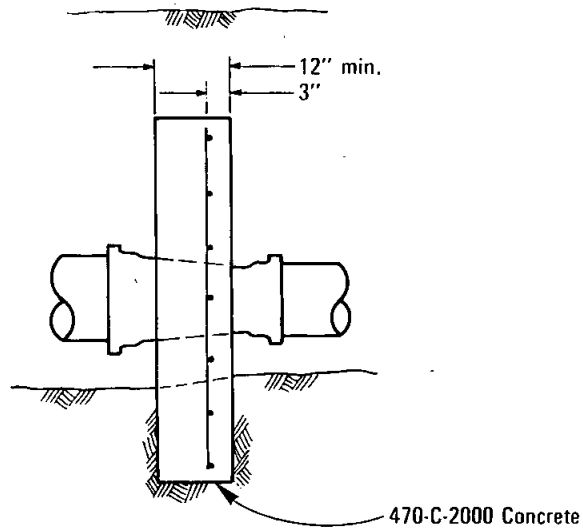
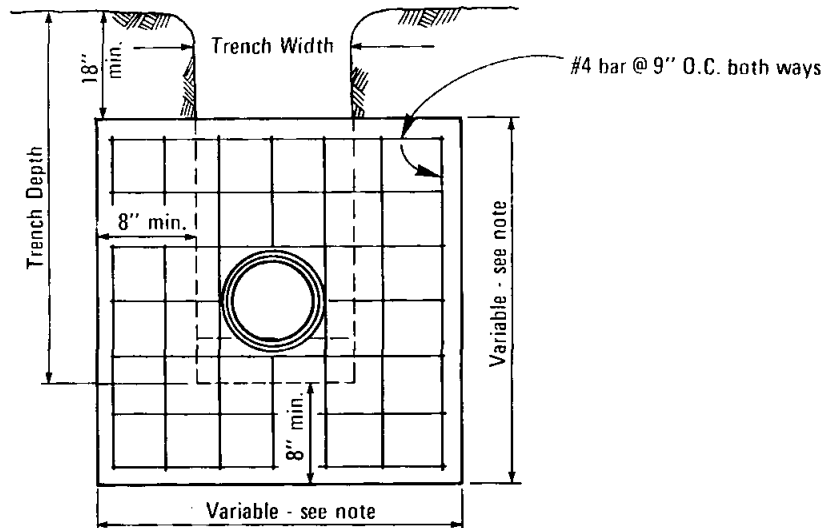
Revision	By	Approved	Date



NOTES

1. For trenching on improved streets see standard drawing G-24 or G-25 for resurfacing details.
2. (*) indicates minimum relative compaction.

Revision	By	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING		RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE	
Section	SC	D.S.	7-79			<i>Allan A. Kuehn</i> <i>Dec. 1975</i> Coordinator R.C.E. 19807 Date	
				PIPE BEDDING AND TRENCH BACKFILL FOR WATER MAINS		DRAWING NUMBER	
						W-21	



NOTE:

Bearing area shall be the difference between the bearing areas required for thrust anchorage of mains on each side of reducer as found from Std. Dwg. W-18 plus the area of the trench opening, except that minimum dimensions shown shall be adhered to.

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

David J. Solomon *July 1979*
Coordinator R.C.E. 25291 Date

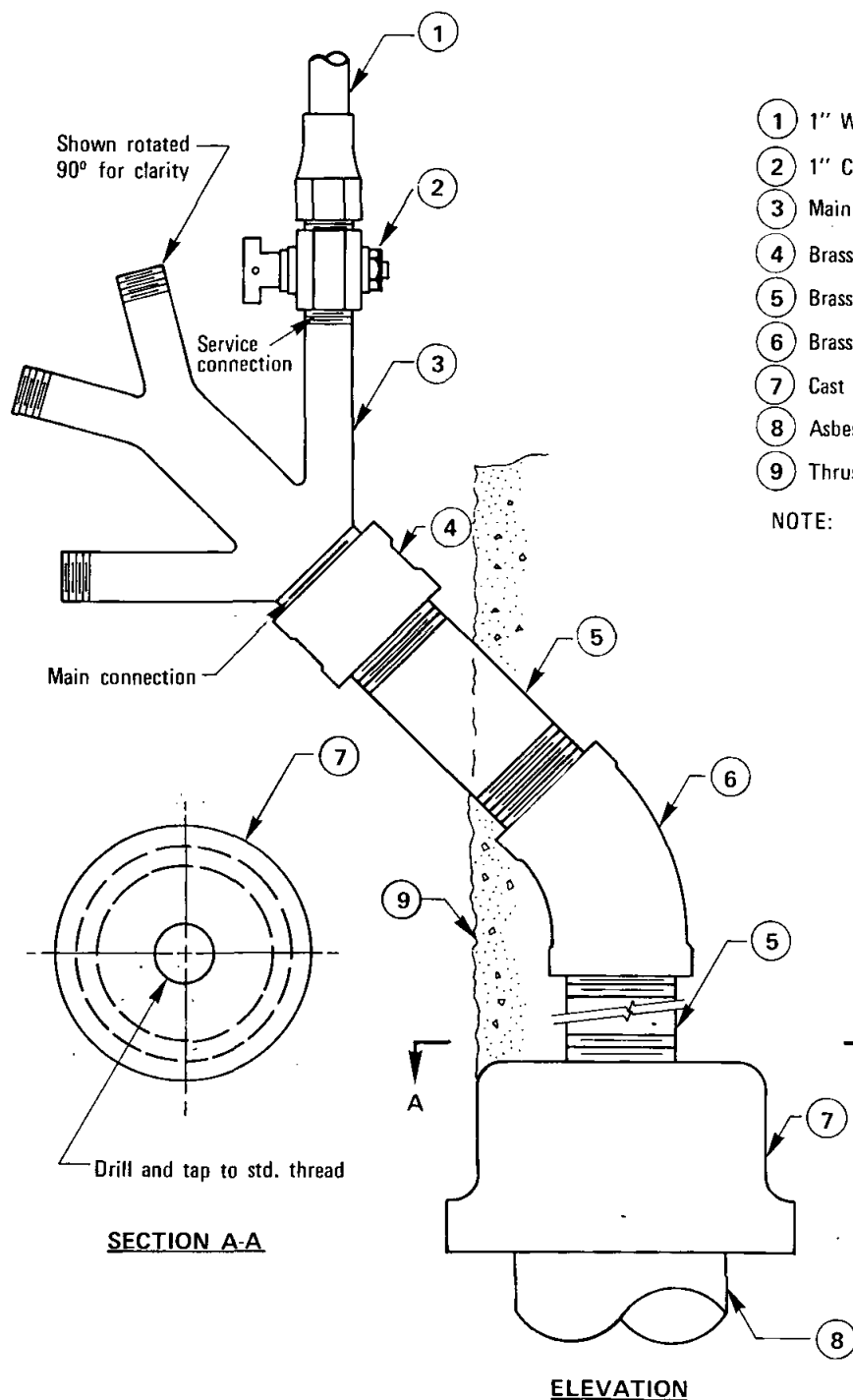
SAN DIEGO REGIONAL STANDARD DRAWING

**THRUST ANCHOR FOR
WATER MAIN REDUCER - 4 THRU 16 INCH**

DRAWING
NUMBER

W-22

Revision	By	Approved	Date

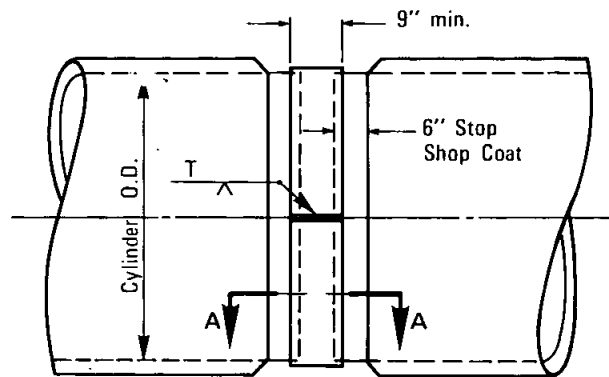


- ① 1" Water service per Dwg W-1
- ② 1" Curb stop
- ③ Main connection X multiple branch connection
- ④ Brass coupling or 45° elbow
- ⑤ Brass nipple - 4" min. length
- ⑥ Brass 45° elbow
- ⑦ Cast iron cap
- ⑧ Asbestos cement pipe
- ⑨ Thrust block per Dwg W-17

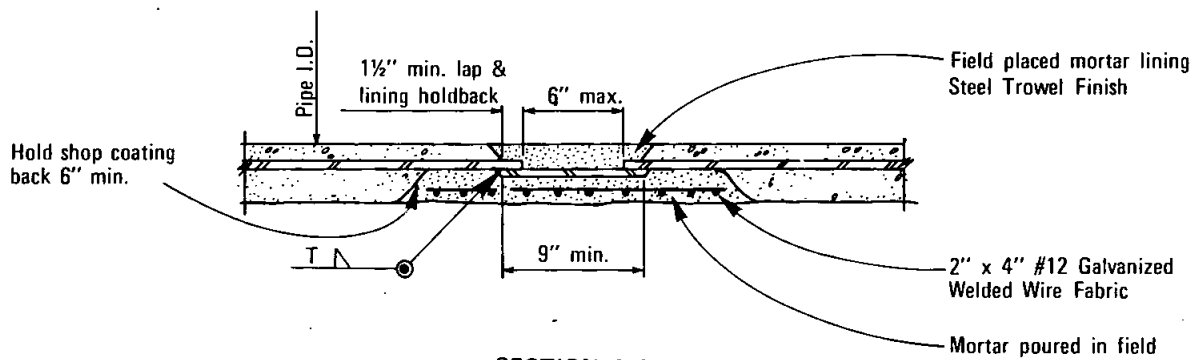
NOTE: Nipple lengths to be sufficient to allow service connection to clear thrust block.

Service Connection	Main Connection Item 5
2	1 1/4"
3	1 1/2"
4	2"
6	2 1/2"
8	3"

Revision	Approved	Date	SAN DIEGO REGIONAL STANDARD DRAWING	RECOMMENDED BY THE SAN DIEGO REGIONAL STANDARDS COMMITTEE
			MULTIPLE SERVICE ASSEMBLY DEAD END MAIN	<i>David J. Solomon</i> July 1979 Coordinator R.C.E. 25291 Date
			DRAWING NUMBER	W-23



ELEVATION



SECTION A-A

NOTE:

Contractor shall provide handholes as required to complete the work

RECOMMENDED BY THE SAN DIEGO
REGIONAL STANDARDS COMMITTEE

David Solomon *July 1979*
Coordinator R.C.E. 25291 Date

DRAWING
NUMBER

W-24

SAN DIEGO REGIONAL STANDARD DRAWING

SPLIT BUTT STRAP

Revision	By	Approved	Date

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